

# ***Hood Canal Coordinating Council***

## ***Salmon Habitat Recovery Strategy***

***for  
the Hood Canal  
&  
Eastern Strait of Juan de Fuca***

***Version 03-2004***



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## EXECUTIVE SUMMARY

In the summer of 2003, upon completion of the Salmon Recovery Funding Board (SRFB) 4<sup>th</sup> round of funding, the Hood Canal Coordinating Council (HCCC) asked lead entity participants to convene a representative working group focused on improving our local implementation process and updating the *Salmon Habitat Recovery Strategy* (Strategy). The Lead Entity Process Advisory Committee (LEPAC) met to review and discuss the Strategy's direction, focus and intent, and worked with the HCCC to revise and update the Strategy. The result is a more highly focused Strategy that uses scientific and technical information to develop prioritized project lists in the nearshore and freshwater environments, while recognizing and supporting community interests to promote successful projects and foster long-term stewardship.

### Scientific Information and Technical Foundation

The foundation for the Strategy is more than five years of local collaboration to define salmon habitat recovery in Hood Canal (HC) and the Eastern Strait of Juan de Fuca (SJF). The LEPAC discussions for Strategy revisions focused on updating scientific and technical information and including community interests to improve our overall approach to project prioritization.

Consistent with previous versions, the revised Strategy prioritizes Endangered Species Act (ESA)-listed and Salmonid Stock Inventory (SaSI)-critical stocks for restoration and protection actions. The revised Strategy goes further by adopting a conservation biology approach within three eco-regions of Hood Canal, represented roughly by Water Resource Inventory Area (WRIA)<sup>1</sup> boundaries, in an attempt to conserve the regional genetic and habitat diversity within the Summer Chum Salmon ESU.

In addition, priority habitat action areas within each watershed are defined by the distribution of salmonid species and their supporting habitats and watershed processes (see Table below). Potential habitat actions are proposed for each watershed based on accumulated information and analyses such as the Limiting Factors Analysis (LFA) and other watershed analyses. Priority habitat action areas for nearshore environments are also recommended based on the developing but limited research available for this critical environment.

The highest priority for the Strategy is to protect and restore what we have documented as the focal species' habitat and the watershed processes that support and maintain that habitat. Within watersheds, the Strategy prioritizes habitat supporting ESA-listed stocks, then habitats supporting other anadromous salmonids, followed by all other freshwater habitats. This approach outlines the Priority 1, Priority 2 and Priority 3 Action Areas for Tier 1, Tier 2, and Tier 3 watersheds (Table A on the next page).

Past versions of the Strategy have prioritized all nearshore areas within the highest tier of protection. However, as we have learned more about juvenile salmonid behaviors, we have become more specific in our prioritization of these critical habitats. We have outlined an approach to compare the various types of estuary and nearshore habitats and their importance to salmonids, especially HC/SJF summer chum and Chinook salmon (Table B on the next page). An initial effort was made to provide a "guideline" for comparing habitat actions between freshwater and nearshore areas.

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<sup>1</sup> The Hood Canal Coordinating Council Lead Entity area includes in part or in whole WRIAs N14, W15, 16 and 17.

<b>Table A: Priority Freshwater Habitat Areas by Tier</b>			
	Tier 1 (T-1)	Tier 2 (T-2)	Tier 3 (T-3)
Priority-1 <sup>2</sup>	<ul style="list-style-type: none"> <li>Listed species distribution</li> <li>Contributing processes to P-1 segments</li> </ul>	<ul style="list-style-type: none"> <li>Listed species distribution</li> <li>Contributing processes to P-1 segments</li> </ul>	
Priority-2	<ul style="list-style-type: none"> <li>Other anadromous salmonid segments not identified in P-1</li> <li>Contributing processes to P-2 segments</li> </ul>	<ul style="list-style-type: none"> <li>Other anadromous salmonid segments not identified in P-1</li> <li>Contributing processes to P-2 segments</li> </ul>	<ul style="list-style-type: none"> <li>Other anadromous salmonid segments not identified in P-1</li> <li>Contributing processes to P-2 segments</li> </ul>
Priority-3	<ul style="list-style-type: none"> <li>Other freshwater habitat</li> </ul>	<ul style="list-style-type: none"> <li>Other freshwater habitat</li> </ul>	<ul style="list-style-type: none"> <li>Other freshwater habitat</li> </ul>

<b>Table B: Priority Nearshore Habitat Areas</b>	
Priority-1	<ul style="list-style-type: none"> <li>Estuarine deltas associated with Tier 1 watersheds</li> <li>Tidal marsh complexes and eel grass meadows historically contiguous and within 1 mile of Tier 1 estuarine deltas</li> </ul>
Priority-2	<ul style="list-style-type: none"> <li>Estuarine deltas associated with Tier 2 watersheds</li> <li>All other tidal marsh complexes and eel grass meadows</li> <li>Kelp forests and shallow-water shorelines within 1 mile of Tier 1 and Tier 2 estuarine deltas</li> </ul>
Priority-3	<ul style="list-style-type: none"> <li>All other estuarine delta habitat</li> <li>Kelp forests and shallow-water shorelines farther than 1 mile from Tier 1 and Tier 2 estuarine deltas</li> </ul>
Priority -4	<ul style="list-style-type: none"> <li>Non vegetated sub tidal habitats</li> <li>Non shallow-water shorelines</li> </ul>

### Community Interests

The HCCC recognizes and promotes the importance of fostering community support with respect to salmon habitat recovery in Hood Canal and the Eastern Strait of Juan de Fuca. With a significant and on-going effort from local groups, habitat restoration and protection projects already receive a high degree of community interest and participation. The HCCC and its salmon recovery partners would like to use the success of previous projects involving the community to engage and educate others on long-term stewardship for salmon habitat. Where appropriate, the Strategy attempts to be as specific as possible in identifying potential future projects given existing information while taking into account the interests of our community.

The Strategy prioritizes watersheds, stream reaches and selected estuary habitats based on their potential importance to ESA and SaSI-critical salmonids. By definition, projects that are a good “fit” to the Strategy will be located in the highest priority stream reaches and watersheds for these critical populations. The HCCC also expects, however, that our local partners and citizen constituents will bring forward projects in lower priority reaches and watersheds, and that these projects are necessary to fully implement the Strategy. To provide for these opportunities, we have attempted to build some flexibility into the Strategy and our local process. This is discussed further on page 17 of the Strategy.

<sup>2</sup> P-1 includes the listed species distribution except where non-response reaches fall within Chinook-only habitat.

Through this Strategy, the HCCC and its salmon recovery partners have identified a suite of priority actions in the freshwater and nearshore environments, and have provided a framework for additional, high-quality projects to be proposed as those opportunities arise, particularly those that involve local communities. We believe that all proposed projects can be effectively evaluated during our local review and prioritization process based on their individual merits and community support.

### **Overall Approach to Guide Project Priorities**

In summary, the HCCC is using the principles of triage, conservation biology, a sound technical foundation based on best available science and hypotheses testing, in addition to a directed interaction with the local community, to focus protection and restoration actions in nearshore and freshwater priority areas. The overall approach to protect and restore ESA-listed and SaSI-critical stocks in Hood Canal uses a project ranking system, a local technical team comprised of scientific and technical experts that evaluate projects using defined technical criteria, and a citizens committee for final evaluation of projects using defined socio-economic criteria. The process seeks to involve the local community in high-quality habitat restoration and protection projects where and when appropriate to foster long-term stewardship.



## INTRODUCTION AND APPROACH

The Salmon Habitat Recovery Strategy (Strategy) for Hood Canal (HC) and the Eastern Strait of Juan de Fuca (ESJF) was developed with the help and involvement of a variety of people and interests in the Hood Canal and Eastern Strait of Juan de Fuca region concerned with undertaking salmon habitat recovery projects. It was originally developed in response to the need for a common "script" in an effort to avoid duplication and to work as strategically as possible on the projects that would have the biggest benefit to the most numbers and species of fish. The Strategy was revised in 2002, and again in the summer, fall, and winter of 2003, with the help of a diverse group representing local interests in salmon habitat recovery.

The Strategy is set within a context of other issues and efforts to recover salmon. The "Four H's" are the focus of discussions on salmonid population decline and potential extinction. Those "H's" represent the issue areas that must be addressed to recover salmon and sustain their recovery over time. The "Four H's" are: Harvest Management, Hatchery Production and Supplementation, Hydropower Management (dams) and Habitat Protection and Restoration. This Strategy directly addresses the Habitat protection and restoration component.

Harvest Management is addressed by the State of Washington and the Treaty Tribes acting as "Co-managers," as defined in the "Boldt Decision" and affirmed by the US Supreme Court (*US v. Washington, 1974*). They jointly determine fish harvest rules and enforcement regulations, and are overseen by federal agencies to ensure minimal impact is made to fish listed under the federal Endangered Species Act. Hatchery production and supplementation in Hood Canal and the Eastern Strait consists of hatcheries and smaller brood-stocking efforts by the co-managers, private groups and federal agencies. These efforts are also overseen by federal agencies to avoid creating problems for listed species. The Hydropower Management (dams) issue is regulated either by state agencies or the federal government, depending on ownership, size and function of the dam. Smaller dams are regulated by Washington State, while the Federal Energy Regulatory Commission (FERC) regulates the larger dams. Again, both state and federal agencies are mandated to avoid harming listed fish.

The three "H's" described above are certainly not easy to address, however, in comparison to habitat protection and restoration issues, they have fewer involved and affected parties and arguably fewer and less complex issues to resolve. This Strategy focuses on habitat protection restoration issues that affect salmon recovery. To further define the habitat issue and our approach, and to put it in manageable terms, we have chosen to view habitat degradation and the recommended solutions into three groupings. That division will help us differentiate between what can be addressed directly with projects or regulatory actions, and what cannot be directly addressed. Those three parts are: ocean and climate conditions, regulation of land use and development, and direct protection and restoration actions.

Ocean and climate conditions strongly influence salmon survival and production, as witnessed recently through an increase in returning adult salmon throughout the Northwest. Anthropogenic influences on these regimes are important to understand, but problematic to address at watershed levels.

Regulation of land use and development is a highly political process and is generally handled within the province of local governments. Only the cities and counties with appropriate jurisdiction can address habitat protection through regulation of private lands. Federal and state agencies only have direct regulatory control over land use on lands that are owned by those

agencies. The Strategy and salmon recovery process in Hood Canal seek to educate and engage policy-makers to implement long-term policies with an eye toward positive impact for salmon and their habitat. Where appropriate, the Strategy identifies potential actions that directly affect salmon habitat recovery. Although the current regulatory regimes are considered in our assessment and recommended actions, regulatory approaches to salmon habitat recovery are not directly addressed in the Strategy.

The third category, direct protection and restoration activities, is the focus of this Strategy. It aims to identify and describe habitat problems and guide voluntary salmon habitat protection and restoration projects in the Hood Canal and Eastern Strait of Juan de Fuca.

### Vision and Goals

We hope to implement, and ultimately attain, the following Vision and Goals by applying this Strategy. Our Vision is that the Hood Canal Coordinating Council and its partners is to assure the continuing existence of wild salmon in the Hood Canal and the Eastern Strait of Juan de Fuca watersheds. We will do this in the short-term by implementing strategic actions to maximize the productive capacity of that habitat. In the long-term, we strive to achieve genetically diverse, self-sustaining and abundant salmon populations that will support healthy ecosystems, and ceremonial, subsistence, recreational and commercial fisheries throughout the Canal and Eastern Strait. This vision for salmon habitat recovery was developed at a meeting of our project partners in the spring of 2000.

To implement this Vision, our Goals are to 1) prioritize assessment, protection and restoration activities in the most productive and important geographic areas for salmon; 2) have those activities be the most appropriate types of activities; and 3) have them be the highest priority activities for those particular watersheds, estuaries and nearshore areas. Each of these goals can be implemented through this Strategy.

### Recovery Philosophy and Approach based on Stocks

While we recognize that most wild salmonid stocks in our region are in need of habitat restoration and protection, the Strategy to date has set up levels of priorities between and within watersheds based on stocks that are most troubled. Although ESA-listed species (HC/ESJF summer chum salmon, Puget Sound Chinook salmon, and bull trout) and SaSI-critical stocks seem to be the most critical at this time (Table 1), we recognize that there are additional populations of wild salmonids that may also need immediate help.

Genetic studies done to date for summer chum were outlined in the Summer Chum Salmon Conservation Initiative, Supplemental Report No. 4 (WDFW and PNPTT, 2003) and a draft Puget Sound Technical Recovery Team Report (Currens, in prep.). These reviews suggest that genetic differences occur within the existing stocks of the ESU.

As a region, we have chosen to build on principles of conservation biology for HC/ESJF summer chum salmon by recognizing not only these genetic differences, but also the unique habitats supporting summer chum salmon. Identification of these unique habitats corresponds well with recent eco-regional approaches to landscape assessment in Puget Sound, as well as by our local WRIA boundaries. These areas may be generalized as eastern Hood Canal, western Hood Canal, and the eastern Strait of Juan de Fuca.

The Strategy approach to habitat prioritization is also consistent with the approach taken by WDFW and PNPTT, Supplemental Report No. 5 (2003) to identify interim recovery goals for

summer chum. In that approach, to protect and increase population diversity of summer chum within the ESU, (1) no less than the six extant Hood Canal natural stocks (Quilcene, Dosewallips, Duckabush, Hama Hama, Lilliwaup, and Union) and two Strait of Juan de Fuca natural stocks (Salmon/Snow, Jimmycomelately) must meet all of the individual stock recovery criteria, (2) planning and implementation of effective habitat protection and recovery actions by the agencies and local governments who have the jurisdiction (e.g., Jefferson, Kitsap, Mason, and Clallam counties) are supported, (3) rebuilding by natural and artificial means (under the guidelines of the SCSCI) the existing summer chum stocks to meet their abundance and escapement recovery goals is supported, and (4) re-establishment of selected extinct summer chum stocks (e.g., Big Beef, Chimacum, Tahuya) into formerly occupied habitats is supported.

It should be noted that while, in general, production and/or productivity are lower for individual streams in lower tiered drainages, a series of these drainages, or a series of projects in a single drainage, could collectively be of equal or greater significance to salmon than a single drainage in a higher tier. This tiering structure (Table 1) was updated over several meetings of our HCCC Technical Team and then validated through additional meetings with our project partners over the summers of 2000 to 2003.

**TABLE 1 – GEOGRAPHIC PRIORITIES<sup>1</sup>**

<b>Tier 1 Watersheds</b>	Salmon/Snow, Big Quilcene, Dosewallips, Duckabush, Hama Hama, Skokomish, Union, and Tahuya River watersheds.
This Tier consists of drainages that have the capacity, or potential (historically based) capacity, to be habitat for 2 or more ESA-listed (Summer Chum and Chinook salmon and Bull Trout) or SaSi-critical species. In addition, several watersheds are prioritized in Tier 1 to support conservation of unique habitats supporting stocks of Summer Chum Salmon.	
<b>Tier 2 Watersheds</b>	Little Quilcene, Chimacum <sup>2</sup> , Lilliwaup, Big Anderson, Big Beef <sup>2</sup> and Dewatto river watersheds.
This Tier consists of drainages that have the capacity, or potential (historically based) capacity, to be habitat for 1 ESA listed species.	
<b>Tier 3 Watersheds</b>	Little Goose, Piddling, Ludlow, Unnamed 17.0191, Shine, Bones/Hubbard, Thorndyke, Fisherman Harbor, Camp Discovery, Tarboo, Jakeway, Donovan, Indian George, Spencer, Marple, Turner, Walker, McDonald, Fulton, Schaerer, Waketickeh, Jorsted, Eagle, Little Lilliwaup, Sund, Miller, Clark, Finch, Hill, Enatai, Minerva, Alderbrook/Big Bend, Twana, Unnamed 14.0133, Forest Beach, Unnamed 14.0131, Unnamed 14.0130, Happy Hollow, Unnamed 14.0128, Holyoke, Lakewood, Devereaux, Sweetwater, Big Mission, Little Mission, Johnson 15.0492, Hall, Stimson, Unnamed 14.0186, Unnamed 14.0185, Cady, Little Shoofly, Shoofly, Caldervin, Brown, Rensland, Don Lake, Harding, Nellita, Boyce, Stavis, Seabeck, Little Beef, Johnson 15.0387, Little Anderson, Cattail Lake, Jump-Off-Joe, Cougar, Gamble and Martha John Creek watersheds.
This Tier consists of drainages that have the capacity to be habitat for anadromous stocks.	
<b>Tier 4 Watersheds</b>	Streams containing non-anadromous, or cutthroat only, fishes and all other Independent Drainages not listed above.

1 – Refer to Appendix A for maps. Drainages listed are only those that are independent drainages to Hood Canal & the Eastern Strait. All other water bodies and creeks that are tributary to an independent drainage are considered subsumed under that independent drainage name.

2 - Summer Chum extirpated, reintroduced through stock supplementation program.

### Priority Activities and Action Areas within Watersheds and the Nearshore

In looking at the types of actions that might be undertaken, we have developed a guiding philosophy. That philosophy looks at assessment, protection and restoration and suggests that when contemplating a project or activity it is critical to have adequate information on which to base an action. If that information is not available, then an approach should be outlined to obtain it. Once the information needed to make decisions is collected, a determination can be made on whether the habitat warrants protection and/or restoration. This hierarchy of action and scientific analysis of the health of our ecosystem completed to date has generated potential project lists for each watershed.

The highest priority for the Strategy is to protect and restore what we have documented as the focal species' habitat and the watershed processes that support and maintain that habitat. Within watersheds, the Strategy prioritizes habitat supporting ESA-listed stocks, then habitats supporting other anadromous salmonids, followed by all other freshwater habitats. This approach outlines the Priority 1, Priority 2 and Priority 3 habitat areas for Tier 1, Tier 2, and Tier 3 watersheds (Table 2).

<b>TABLE 2 – Priority Freshwater Habitat Areas By Tiers</b>			
	<b>Tier 1 (T-1)</b>	<b>Tier 2 (T-2)</b>	<b>Tier 3 (T-3)</b>
Priority-1 <sup>3</sup>	<ul style="list-style-type: none"><li>Listed species distribution</li><li>Contributing processes to P-1 segments</li></ul>	<ul style="list-style-type: none"><li>Listed species distribution</li><li>Contributing processes to P-1 segments</li></ul>	
Priority-2	<ul style="list-style-type: none"><li>Other anadromous salmonid segments not identified in P-1</li><li>Contributing processes to P-2 segments</li></ul>	<ul style="list-style-type: none"><li>Other anadromous salmonid segments not identified in P-1</li><li>Contributing processes to P-2 segments</li></ul>	<ul style="list-style-type: none"><li>Other anadromous salmonid segments not identified in P-1</li><li>Contributing processes to P-2 segments</li></ul>
Priority-3	<ul style="list-style-type: none"><li>Other freshwater habitat</li></ul>	<ul style="list-style-type: none"><li>Other freshwater habitat</li></ul>	<ul style="list-style-type: none"><li>Other freshwater habitat</li></ul>

Past versions of the Strategy have prioritized all nearshore areas within the highest tier of protection. However, as we have learned more about juvenile salmonid distribution and behaviors, we have become more specific in our prioritization of these critical habitats. Based on studies of juvenile fish distribution and habitat utilization (Hirschi et al., 2003; Beamer, et al., 2003; Bahls, 2004) and guidance from the Puget Sound Nearshore Ecosystem Restoration Program Science Team (2003), we have outlined an approach based on working hypotheses to compare the various types of estuary and nearshore habitats and their importance to salmonids, especially summer chum and Chinook salmon (Table 3). The HCCC and its salmon recovery partners recognize that these working hypotheses need to be tested so that we can improve the effectiveness of our recommended actions. More complete descriptions of the various estuary and nearshore habitats are presented in a discussion beginning on page 20.

<sup>3</sup> P-1 includes the listed species distribution except where non-response reaches fall within Chinook-only habitat.

<b>TABLE 3 – Priority Nearshore Habitat Areas</b>	
Priority	Habitats
P-1	<ul style="list-style-type: none"> <li>• Estuarine deltas associated with Tier 1 watersheds</li> <li>• Tidal marsh complexes and eel grass meadows historically contiguous and within 1 mile of P-1 estuarine deltas</li> </ul>
P-2	<ul style="list-style-type: none"> <li>• Estuarine deltas associated with T-2 watersheds</li> <li>• All other tidal marsh complexes and eel grass meadows</li> <li>• Kelp forests and shallow-water shorelines within 1 mile of P-1 and P-2 estuarine deltas</li> </ul>
P-3	<ul style="list-style-type: none"> <li>• All other estuarine delta habitat</li> <li>• Kelp forests and shallow-water shorelines farther than 1 mile from P-1 and P-2 estuarine deltas</li> </ul>
P-4	<ul style="list-style-type: none"> <li>• Non vegetated sub tidal habitats</li> <li>• Non shallow-water shorelines</li> </ul>

The prioritization of our Tier 1 estuarine deltas is based on the hypothesis that for juvenile Chinook salmon (Reimers, 1973; Levings et al. 1989), shorter estuary residence periods result in lower survival than longer estuary residence periods, and that degraded estuarine habitat limits rearing opportunities as freshwater juvenile salmon populations increase (Beamer et al., 2003.) We hypothesize that natal, estuarine habitat use by juvenile summer chum salmon is also density-dependent, especially for degraded systems, limiting summer chum recovery.

Recent studies have also suggested that both natal and non-natal nearshore rearing habitats are important for both juvenile Chinook and summer chum salmon (Hirschi et al., 2003; Beamer, et al., 2003; Bahls, 2004). These habitats include estuarine deltas, associated tidal complexes, and independent tidal complexes. Both large and small estuarine deltas are important in the HCCC region for these critical stocks (Hirschi et al., 2003.) Thus, our hierarchy prioritizes these nearshore habitats, but recognizes that each type of habitat is important in salmon recovery.

The HCCC recognizes the apparent subjectivity in delineating priority nearshore habitat within one mile of natal estuarine deltas. However, this delineation is based on the hypothesis that availability of certain intertidal and subtidal habitats (tidal marsh complexes and eel grass meadows) during the earliest portions of juvenile life [ontogenetic] stages may limit survival during the marine rearing phase.

As our uncertainty about the importance of nearshore habitats for salmonids increases, our associated ranking decreases. It is inherently difficult to develop this type of conceptual model given our limited understanding of juvenile salmonid habitat preferences. Therefore, it should be noted that while we have attempted to lay out an approach to the importance of various nearshore habitats, we expect that there will be improvements to these hypotheses identified over time.

The following “guidelines” are an attempt to blend our priority nearshore and freshwater action areas into a single list. The Lead Entity recognizes the difficulty in reconciling the priority rankings of the nearshore and freshwater projects. Projects identified for funding will be evaluated individually using defined technical criteria. The first and second freshwater priorities

(i.e., T-1 + P-1 and T-2 + P-1) and top nearshore priorities (i.e., P-1 and P-2) collectively represent the highest priorities within the blended freshwater/nearshore approach (Table 4).

<b>TABLE 4 – “Guidelines” for Potential Comparison between Freshwater and Nearshore</b>	
First Freshwater Priority = T-1 + P-1	Nearshore P-1
Second Freshwater Priority = T-2 + P-1	Nearshore P-2
Third Freshwater Priority = T-1 + P-2	Nearshore P-3
Fourth Freshwater Priority = T-2 + P-2	
Fifth Freshwater Priority = T-3 + P-2	
Sixth Freshwater Priority = ALL OTHER	Nearshore P-4

#### Potential Project Lists

We developed Potential Project Lists for each of our drainages and associated estuaries based on watershed and nearshore assessments and other specific information from local experts. The potential project lists suggest actions that will have the greatest benefit to the most imperiled stocks while supporting other stocks. These lists were initially developed in local meetings in Jefferson, Kitsap and Mason Counties with our project partners and tribal and state agency personnel through the summer of 2000. Revisions to those lists were made using the same process starting in the winter and spring of 2001, and again in the summer, fall, and winter of 2003.

#### Community Support

In addition to directly addressing the biological needs of the fish, we also recognize that community support, landowner willingness, and project sponsor preferences must be fostered over time. This approach has generally served to engage the community, begin to implement grass-roots projects, and move project actions toward higher tier drainages over time. Under the State Salmon Recovery Act (RCW 77.85), all salmon recovery activities associated with this Strategy are voluntary. A factor that hinders the movement of community project sponsors toward Tier I drainages is that they are big watersheds that are more complex and not as well understood as smaller watersheds. The potential projects in those areas will likely be larger scale, more complex and much more expensive. Ultimately, we know that without local community understanding, involvement in, and enthusiasm for these actions, attempts to implement them and this Strategy will not be sustainable.

To address the need for community support of projects and to fulfill the grassroots vetting of projects required in the Salmon Recovery Act, the actual ranking of projects selected for submission (e.g., to the SRFB) necessarily requires the balancing of biologically driven needs and community desires. Our final citizen ranking of projects for SRFB submittal meets that balancing test. In addition to having a more locally acceptable list of projects, this citizen ranking also gives us the opportunity to work incrementally towards communities that are less interested or willing to engage in salmon habitat restoration. By making headway now with willing landowners who are enthused about habitat projects on their land and then exemplifying those satisfied landowners when addressing others, we hope to make significant progress in educating and engaging the local community in salmon habitat recovery. This idea is also supported by working on degraded, highly visible state-owned lands such as State Parks.

The Strategy prioritizes watersheds, stream reaches and selected estuary habitats based on their potential importance to ESA and SaSI-critical salmonids. By definition, projects that are a good “fit” to the Strategy will be located in the highest priority stream reaches and watersheds for these critical populations. The HCCC also expects, however, that our local partners and citizen constituents will bring forward projects in lower priority reaches and watersheds, and that these projects are necessary to fully implement the Strategy.

It may also be the case that our project lists may not be in rank, numerical order from Tier 1 down to Tier 4, due to the flexibility that we have built into our local process. This flexibility clause is designed to recognize that not all projects are created equal. It may be the case that a project in a Tier 1 watershed is less critical than a project in a Tier 2 or 3 watershed, and that these values must be based on the individual projects’ benefits to salmon and their certainty of success, given the best available science. For example, given two projects of similar type (i.e. levee removal and wetland/side channel restoration) but with one project on a Tier 1 and the other on a Tier 2 watershed, the project on the Tier 2 watershed may be more valuable if it’s spatial, ecological, and/or temporal scale was significantly larger. It is expected that our local technical (and possibly citizen-based) ranking process is robust enough to effectively evaluate projects on their individual merits, and recommend (or not) initiation of the flexibility clause.

Although this Strategy is focused on the prioritization of habitat protection and restoration projects, we do not intend for it to function independently. Its intent is to link with and adapt to the other “H” action areas, where appropriate. When changes are identified in those other “H’s” that affect the appropriateness of this Strategy, or its various parts, the Strategy will be revised and updated where needed.

By advocating all the actions described in this Strategy, addressing land use and development, as well as actions within the realm of the other “H’s,” we believe that attaining the abundance, diversity, and productivity needed to help recover salmon and the ecosystems on which they depend is possible.

This Strategy approach is consistent with other habitat strategies that have been proposed for Pacific Northwest watersheds (Beechie et al. 1996; Bradbury et al. 1995; Frissell 1993; NMFS 1996; Reeves et al. 1996). It grew out of discussions among HCCC members and our partners to provide a unified vision of habitat recovery in Hood Canal and the Eastern Strait of Juan de Fuca. It is also consistent with, and builds upon, many other efforts and sources of information developed in the Hood Canal and Eastern Strait. Some of those efforts include the Summer Chum Salmon Conservation Initiative (WDFW, 2000), the Dungeness/Quilcene plan, existing watershed plans, and US Forest Service and Washington Department of Natural Resources watershed analyses and assessments.

#### Monitoring and Adaptive Management

Monitoring and adaptive management are necessary components for any of the actions taken under this Strategy to protect and restore salmon habitat. Monitoring gives us the ability to measure our success. Just as importantly, adaptive management gives us the ability to use that monitoring information to take more effective and efficient actions in the future.

Implementation monitoring is being performed by SRFB staff. SRFB has also recently initiated an effectiveness monitoring plan, recommended by the Washington State Comprehensive Monitoring Strategy, which will randomly monitor most project types (with the notable exception of estuarine projects.) Effectiveness monitoring is being implemented by an independent



consultant using standardized protocols and a statistically rigorous design so that results can be “rolled-up” to improve our management of habitat projects. The HCCC is also working with state and local partners in developing validation monitoring approaches through the Intensively Monitored Watershed program. In the HCCC area, this work has focused on the west Kitsap watersheds of Little Anderson, Big Beef, Seabeck, and Stavis Creeks.

## REGIONAL ISSUES OF CONCERN

Within the Hood Canal and the Eastern Strait of Juan de Fuca there are numerous problems that affect salmonids on a localized basis. Those problems must be addressed on a local scale. There are also some problems that are "regional" in nature and must be addressed through a more complex approach of multiple landowners, agencies and organizations. These problems cross watershed, county and WRIA boundaries. They pose special challenges for those engaged in salmon recovery efforts. These problems are physically large, very costly and complicated to address. Nonetheless, they can and must be addressed, and when they are, their remediation will post huge gains for all salmonids and other estuarine dependent fauna in the Hood Canal and Eastern Strait of Juan de Fuca.

Two of those currently identified high priority regional problems are:

- *Physical blockage, destruction of habitat, and functional degradation of estuaries and alongshore processes by earthen fill causeways supporting US Highway 101 along the west side of Hood Canal and along the eastern Strait of Juan de Fuca.* This problem impacts, to different degrees, five of the major west side drainages identified as Tier 1 and 2 (the Skokomish, Lilliwaup, Hama Hama, Duckabush, and Dosewallips Rivers) as well as Salmon and Snow Creeks along the eastern Strait of Juan de Fuca. To address this problem, the Washington State Department of Transportation (WSDOT) and it's salmon recovery partners will need political support locally because of the disruptions to the public and local land owners that any realignment or reconstruction work would entail. WSDOT will also need political support and substantial amounts of funding from the State Legislature and the US Congress, because of the high costs of the various projects that would be required to address this issue, and because of the lower funding priority of Highway 101 relative to other roadways in the state.
- *Sediment delivery to many major rivers and streams from erosion and mass wasting on US Forest Service roads.* This problem impacts streams all along the west side of Hood Canal and in the eastern Strait of Juan de Fuca. To address this problem the US Forest Service (USFS) will need local political support to close many of the failing roads that are no longer used for logging access, and to upgrade and stabilize roads still used for resource protection and management, or for recreation. The USFS will also need political support and substantial amounts of funding from the US Congress because of the high cost of this program. An adequate and stable budget for road maintenance is also needed to reduce risks of sedimentation from inadequately maintained roads in the future. The USFS Access and Travel Management Plan (2003) has laid out a comprehensive and prioritized approach to managing their road networks.

## ESTUARY & MARINE NEARSHORE AREAS<sup>4</sup>

All salmon species must migrate through the nearshore during outmigration to the sea and their return journey to spawn. Nearshore areas within Hood Canal and the Eastern Strait of Juan de Fuca support multiple species and stocks of salmon that originate here as well as from outside the area. The nearshore, and estuaries in particular, have been termed the life support system for juvenile salmon feeding, rearing and migrating (Healey 1982, Simenstad et al. 1982). Most uvenile anadromous salmon are recognized as being fundamentally dependent on nearshore ecosystems. Those systems also directly support the feeding and in-migration of adults. Currently, the nearshore is increasingly understood as a critical, year-round habitat for salmon, not just as an in and out migration environment as was thought in the past. Additionally, nearshore areas here support forage fish such as surf smelt, sand lance and herring. Those fish are critical prey for salmon.

There are many ways of conceptualizing or defining the marine nearshore and estuary environments. One definition of nearshore applied to the Puget Sound-Georgia Basin has the nearshore beginning at 200 feet upland of ordinary high water and extending seaward to a depth of 65 feet below mean low water. This gives a physical sense of scale but is not descriptive. In looking at physical elements, nearshore habitats include: eelgrass meadows, kelp forests, sand and mudflats, tidal marshes, river mouths and deltas, sand spits, beach and backshore areas, banks and bluffs, and marine riparian areas (Dethier 1990.)

Williams and Thom (2001) describe these habitats in further detail. Eelgrass is a marine plant that forms in small patches to large meadows in the low intertidal and shallow subtidal zone in both estuaries and protected nearshore marine habitats. Juvenile salmonids may use eelgrass for feeding and rearing; herring use eelgrass as a spawning substrate. Bull kelp is a brown alga that forms small patches to large forests in the shallow subtidal zone in Puget Sound. It provides refuge and feeding habitat for fishes, spawning substrate for herring, and buffering of wave and current energy.

Flats, sand spits, beaches, and backshore habitats (and lagoons) are generally comprised of gentle slopes with a mixture of substrate including mud mixed with organics, sand, gravel, and/or cobble. Sand and mudflats provide a number of functions including prey production for juvenile salmon. Large woody debris may accumulate in backshore areas and beaches at extreme high tides, and can help stabilize the shoreline. It is believed that this debris provides foraging, refuge, and spawning substrate for fishes.

Tidal marshes and channels are either directly connected to or predominantly isolated from watershed sediment processes and freshwater flows. They function similarly to wetlands. Juvenile salmon have been shown to reside in both tidal marshes and channels. They may also be important in ameliorating nutrient inputs from watersheds.

Banks and bluffs (cliffs) are steeply sloped areas located between the intertidal zone and the upland. They can be comprised of sediments of varying grain sizes, as well as rocks and boulders. They are important for sediment recruitment to the marine environment.

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<sup>4</sup> Extensive portions of this section were incorporated or paraphrased from the *HCCC-NOPLEG Nearshore Framework* document, Cambalik, et al. 2001.

Marine riparian habitats are characterized by dense vegetation and occur at the interface between terrestrial and aquatic ecosystems. They support at least seven different functions critical to the nearshore environment.

Descriptions of these physical components are helpful in articulating what comprises the nearshore and estuary environment; however, we must also consider the processes that are integral to those environments. Some of these processes include: primary productivity; secondary productivity; organic matter flow; nutrient cycling; sediment processes (erosion, transport, deposition and storage); and hydraulic processes (tides, currents, rainfall, runoff, river flow, groundwater movement).

Primary productivity refers to production by plants of organic compounds that supply energy for the food web. Light, nitrates and phosphates drive primary productivity. Secondary productivity refers to the growth of small animals (primary consumers) many of which are salmon prey. Organic matter flow refers to the movement of plant and animal material (live, decaying or dead) within the ecosystem. Nutrient cycling involves the breakdown of organic nitrogen and other nutrients required for primary producers. Sediment processes include the erosion, transport, deposition, and storage of sediments, soils and cobbles. Hydraulic processes refer to tides, waves, currents and storm events.

From that ecosystem functional viewpoint, the inland extent of the nearshore encompasses any habitat that is tidally influenced or brackish. The offshore extent is more variable from locale to locale, but is often described as the extent of the photic zone (zone where light can penetrate), or approximately 30 feet below MLLW. This may be anywhere from a few feet offshore to many miles offshore.

In a general sense, it is recognized that undeveloped shoreline segments likely have higher value due to the presence of intact vegetation and the absence of shoreline modifications and hardening. Similarly, many opportunities exist in select areas for active restoration work such as the removal of shoreline armoring, tidegates, and fill materials to return those areas to as much natural function and as near original physical structure as possible.

Currently, we are quickly improving our abilities to physically and functionally map areas in simple geographic fashion. This allows us to begin to prioritize the various habitat discussed above for preservation and/or restoration actions. However, the biggest single limitation we face in correctly outlining nearshore actions is our immature understanding of the link between physical habitats and the fish that use them. As we learn more, we hope to improve the effectiveness of our recommended actions.

## **CONCLUSION**

This Strategy tries to recognize that different local groups and agencies have different mandates, agendas and desires. But, using an overall strategy will help put those different activities into a larger perspective. It will also help balance efforts to make sure that areas with the highest production, productivity and diversity are not ignored or missed because of lack of coordination among the numerous groups working on salmon recovery through a variety of funding sources.

# INDEPENDENT ANADROMOUS DRAINAGES TO HOOD CANAL & THE EASTERN STRAIT OF JUAN DE FUCA

## **Jefferson County/WRIA 17**

### **Drainages: Page 23**

Salmon Creek 17.0245  
Snow Creek 17.0219  
Andrews 17.0221  
Crocker Lake  
Chimacum Creek 17.0203  
Naylor's Creek 17.0208  
Little Goose Creek 17.0200A  
Piddling Creek 17.0200  
Ludlow Creek 17.0192  
Unnamed 17.0191  
Shine Creek 17.0181  
Bones/Hubbard Creek 17.0180  
Thomdyke Creek 17.0170  
Fisherman Harbor Creek  
17.0153  
Camp Discovery Creek 17.0141  
Tarboo Creek 17.0129  
Jakeway Creek 17.0116  
Donovan Creek 17.0115  
Little Quilcene River 17.0076  
Leland Creek 17.0077  
Lake Leland  
Big Quilcene River 17.0012  
Penny Creek 17.0014  
Indian George Creek 17.0011  
Spencer Creek 17.0004  
Marple Creek 17.0001

## **Jefferson County/WRIA 16**

### **Drainages: Page 38**

Turner Creek 16.0559  
Dosewallips River 16.0440  
Walker Creek 16.0441  
Duckabush River 16.0351  
McDonald Creek 16.0349  
Fulton Creek 16.0332  
Schaerer Creek 16.0326  
Waketick Creek 16.0318

## **Mason County/WRIA 16**

### **Drainages: Page 42**

Hama Hama River 16.0251  
Jorsted Creek 16.0248  
Eagle Creek 16.0243  
Lilliwap Creek 16.0230  
Little Lilliwap Creek 16.0228  
Sund Creek 16.0226  
Miller Creek 16.0225  
Clark Creek 16.0224  
Finch Creek 16.0222  
Hill Creek 16.0221  
Enatai Creek 16.0216  
Minerva Creek 16.0215  
Skokomish River 16.0001  
North Fork Skokomish River  
16.0001  
Purdy Creek 16.0005  
Weaver Creek 16.0006  
Hunter Creek 16.0007  
South Fork Skokomish River  
16.0011  
Richert Springs 16.0010  
Vance Creek 16.0013

## **Mason County/WRIA 14**

### **Drainages: Page 50**

Alderbrook/Big Bend Creek  
14.0138  
Twanoh Creek 14.0134  
Unnamed Creek 14.0133  
Forest Beach Creek 14.0132  
Unnamed Creek 14.0131  
Unnamed Creek 14.0130  
Happy Hollow Creek 14.0129  
Unnamed Creek 14.0128  
Holyoke Creek 14.0127  
Lakewood Creek 14.0126  
Devereaux Creek 14.0124

## **Mason County/WRIA 15**

### **Drainages: Page 54**

Sweetwater Creek 15.0505  
Union River 15.0503  
Big Mission Creek 15.0495  
Little Mission Creek 15.0493  
Johnson Creek 15.0492  
Hall Creek 15.0491  
Stimson Creek 15.0488  
Unnamed Creek 15.0486  
Unnamed Creek 15.0485  
Cady Creek 15.0484  
Little Shoofly Creek 15.0482  
Shoofly Creek 15.0478  
Tahuya River 15.0446  
Caldervin Creek 15.0445  
Brown Creek 15.0044  
Rendsland Creek 15.0439  
Don Lake Creek 15.0438  
Dewatto River 15.0420

## **Kitsap County/WRIA 15**

### **Drainages: Page 64**

Big Anderson Creek 15.0412  
Harding Creek 15.0408  
Nellita Creek 15.0407A  
Boyce Creek 15.0407  
Stavis Creek 15.0404  
Seabeck Creek 15.0400  
Little Beef Creek 15.0399  
Big Beef Creek 15.0389  
Johnson Creek 15.0387  
Little Anderson Creek 15.0377  
Cattail Lake Creek 15.0370  
Jump-Off-Joe Creek 15.0369  
Cougar Creek 15.0367  
Gamble Creek 15.0356  
Martha John Creek 15.0354

## JEFFERSON COUNTY/WRIA 17 DRAINAGES

### SALMON CREEK - WRIA 17.0245

Description: Salmon Creek flows from the north slopes of Mount Zion into Discovery Bay at the eastern edge of the Strait of Juan de Fuca, adjacent to Snow Creek. The watershed is approximately 15,150 acres (nearly 24 square miles). Historically, Salmon and Snow Creeks merged a short distance before they entered Discovery Bay but were separated with Snow Creek re-directed to the east. Currently, the Salmon and Snow Creeks estuary is constrained by the Highway 101 causeway and the elevated railroad grade.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing in estuary  
Critical - coho (2002 SaSI)

Depressed - winter steelhead (2002 SaSI)

NOTE: Summer chum supplementation program, 1992-2003; supported reintroduction of summer chum to Chimacum Creek, 1996 to present

Land Use: Land use within Salmon Creek is primarily Olympic National Forest (9,230 acres) and privately held forest lands (5,052 acres). Due to budgetary constraints, the USFS has not been able to properly maintain and/or decommission forest roads, thereby increasing the threat of future sedimentation problems. There is a mixture of agriculture (~150 acres) and rural residential (613 acres) in the lower watershed, with about 10 acres zoned for commercial uses located at the mouths of Snow and Salmon creeks along Highway 101 at the marine shoreline of Discovery Bay. The predominant residential zoning in this watershed (593 acres) is one residence per 20 acres.

#### Protection Activities Completed or Funded:

1. USFS Watershed Analysis completed in September 1996
2. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
3. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
4. Ecosystem Diagnosis and Treatment for summer chum on-going (*but not fully funded*)
5. 3484 meters of road (3 segments) designated for decommissioning in 2003 USFS A&TM (Access & Travel Management) Plan (*but not funded*)
6. 0 meters of road designated for conversion to trail in 2003 USFS A&TM Plan
7. ~123 acres of Salmon/Snow Creek estuary and mainstem (Larrance and Andrews property) purchased by federal T&E species grant through WDFW
8. ~30 acres of Salmon/Snow Creek estuary (Garrison Property) purchased by WDFW, plus additional properties to be purchased by SRFB grant (SRFB contract #01-1346)
9. Jefferson County Conservation District (JCCD) turbidity and intra-gravel dissolved oxygen monitoring

#### Restoration Activities Completed or Funded:

1. Zero miles of USFS roads decommissioned

2. Completion of 2365 feet of new channel and log habitat structures in lower mainstem on WDFW property, to be connected hydrologically in 2004
3. 1540 feet of livestock exclusion fencing installed in lower mainstem
4. Houck Creek sediment abatement project at eroding bluff on Houck property
5. Summer chum salmon stock restoration project for Salmon Creek (1992-2004)
6. Removal of WDFW weir in 2004

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include remaining estuarine parcels, parcels in mainstem floodplain, and any future sediment source abatement parcels downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Remove railroad grade, fill, and levees to restore tidal prism and channel migration
  - b. Restore sinuosity in estuarine channel
  - c. Assess potential to reconnect Snow and Salmon Creeks upstream of SR101; pursue implementation if recommended
  - d. Evaluate and abate the effects of the SR101 bridge
  - e. Control exotic vegetation
4. Continue restoration of natural riverine processes and functions above WDFW property restoration site
  - a. Restore sinuosity and natural channel configuration in artificially-confined reaches by removing riprap, road crossings, and ditching
  - b. Restore stream channel habitat complexity through large woody debris and log jam addition
  - c. Investigate need for off-channel habitat; implement if necessary
  - d. Plant and maintain riparian areas on both public and private properties
  - e. Continue livestock exclusion fencing where appropriate
5. Assess, stabilize, and monitor fine and course sediment sources
  - a. Restore Houck Creek to historic channel
  - b. Implement road decommissioning in upstream forest areas on both USFS and private lands
  - c. Review and improve road maintenance plans to reduce sediment inputs
  - d. Assess scour and deposition
6. Assess flows in WRIA 17 Planning Unit
  - a. Peak Flows
    - i. Assess channel ability to accommodate peak flood flows
    - ii. Assess and correct the individual contributions of subwatersheds to increased peak flows as a result of forest management
  - b. Low Flows
    - i. Assess surface/groundwater withdrawals for impact on low flows
    - ii. Assess instream flow; consider ways to increase instream flows during low flow periods

## SNOW CREEK WRIA 17.0219

Description: Snow Creek flows from the northeast and east slopes of Mount Zion into Discovery Bay at the eastern edge of the Strait of Juan de Fuca. The watershed comprises a total of approximately 14,395 acres (about 22.5 square miles). Historically, Salmon and Snow Creeks merged a short distance before they entered Discovery Bay but were separated with Snow Creek re-directed to the east. Currently, the Salmon and Snow Creeks estuary is constrained by the Highway 101 causeway and the elevated railroad grade.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing in estuary  
Critical - coho (2002 SaSI)  
Depressed - winter steelhead (2002 SaSI)

Land Use: Land use within the Snow Creek Watershed is similar to the Salmon Creek watershed, with additional rural residential land use in the lower watershed. The Olympic National Forest comprises 5,502 acres (38% of the watershed), and privately-held forest lands comprise 7,280 (51% of the watershed). Due to budgetary constraints, the USFS has not been able to properly maintain and/or decommission forest roads, thereby increasing the threat of future sedimentation problems. Rural residential is zoned in 1,120 acres, with 191 acres of zoned agricultural land. There are about 10 acres of land zoned for commercial use located at the mouths of Snow and Salmon creeks along the shoreline of Discovery Bay. The predominant residential zoning in this watershed (650 acres) is one residence per 20 acres.

### Protection Activities Completed or Funded:

1. USFS Watershed Analysis completed in September 1996
2. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
3. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
4. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
5. 481 meters of road (1 segment) designated for decommissioning in 2003 USFS A&TM Plan (*but not funded*)
6. ~123 acres of Salmon/Snow Creek estuary and mainstem (Larrance and Andrews property) purchased by federal T&E species grant through WDFW
7. ~30 acres of Salmon/Snow Creek estuary (Garrison Property) purchased by WDFW, plus additional properties to be purchased by SRFB grant (SRFB contract #01-1346)

### Restoration Activities Completed or Funded:

1. 3979 meters of USFS roads decommissioned
2. Completion of approximately 5000 feet of improved channel (sinuosity and complexity) and riparian planting in lower mainstem on private property
3. 4192 feet of livestock exclusion fencing installed in mainstem, including 0.5 acres of riparian planting
4. Coho salmon stock restoration project for Snow Creek, 1998 to present

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include remaining estuary parcels, parcels in mainstem floodplain, and any future sediment source abatement parcels downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Remove railroad grade, fill, and levees to restore tidal prism and channel migration
  - b. Restore sinuosity in estuarine channel
  - c. Assess potential to reconnect Snow and Salmon Creeks upstream of SR101; pursue implementation if recommended
  - d. Evaluate and abate the effects of the SR101 bridge
  - e. Control exotic vegetation
4. Continue restoration of natural riverine processes and functions above lower mainstem restoration site
  - a. Restore sinuosity and natural channel configuration in artificially-confined reaches by removing riprap, road crossings, and ditching
  - b. Restore stream channel habitat complexity through large woody debris and log jam addition
  - c. Investigate need for off-channel habitat; implement if necessary
  - d. Plant and maintain riparian areas on both public and private properties
  - e. Continue livestock exclusion fencing where appropriate
5. Assess, stabilize, and monitor fine and coarse sediment sources
  - a. Implement road decommissioning in upstream forest areas on both USFS (A&TM) and private lands
  - b. Continue sediment removal at WDFW fish trap facility
  - c. Review and improve road maintenance plan to reduce sediment inputs
  - d. Assess and restore natural levels of sediment input from debris jam and slide areas
  - e. Assess scour and deposition
6. Assess flows in WRIA 17 Planning Unit
  - a. Peak Flows
    - i. Assess channel ability to accommodate peak flood flows
    - ii. Assess and correct the individual contributions of sub watersheds to increased peak flows as a result of forest management
  - b. Low Flows
    - i. Assess surface/groundwater withdrawals for impact on low flows
    - ii. Assess instream flow; consider ways to increase instream flows during low flow periods

Andrews Creek - WRIA 17.0221, a tributary to Snow Creek

Description: Andrews Creek historically flowed into a wetland complex in the Highway 101 valley and most likely fed both the Little Quilcene River and Snow Creek. Today, the majority of flow is channeled through agricultural lands and into Crocker Lake before entering Snow Creek.



An outlet from Crocker Lake was modified to change outflow from a wetland-type connection to a direct stream connection, although this has brought with it the need to maintain that outlet.

Stock Status: See salmon distribution maps in Appendix A.  
Coho, cutthroat

Land Use: Rural residential, agriculture and forestry

Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
2. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
3. 2587 meters of road (1 segment) designated for conversion to trail in 2003 USFS A&TM Plan (but not funded)
4. One parcel above Crocker Lake has been enrolled in the Wetlands Reserve Program

Restoration Activities Completed or Funded:

1. Completed 4000 feet of stream enhancement (complexity and sinuosity) along SR101 by WSDOT, JCCD, WOS, and JFE
2. 4895 feet of livestock exclusion fencing
3. 4.1 acres of riparian zone planted
4. National Resource Conservation Service planting above Crocker Lake under Wetlands Reserve Program
5. Removal of fish passage barrier and non-native fishes in Crocker Lake

Potential Project List:

1. Implement USFS A&TM Plan (see above)
2. Restore sinuosity and natural channel configuration in artificially-confined reaches
3. Restore stream channel habitat complexity through large woody debris and log jam addition
4. Revegetate riparian area
5. Control reed canary grass at outlet from Crocker Lake
6. Improve storm drainage and erosion impacts from the creek that drains the south side of SR104 and flows into the east side of Crocker Lake
7. Restore fish passage

### **CHIMACUM CREEK - WRIA 17.0203**

Description: The Chimacum watershed drains into southern Port Townsend Bay, about 5 miles south of the City of Port Townsend. The Chimacum watershed is approximately 22,347 acres (about 35 square miles), draining the majority of the Quimper Peninsula.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing;  
Puget Sound Chinook salmon rearing in estuary  
Healthy - coho (2002 SaSI)  
NOTE: Summer Chum stock was extirpated (extinct in 2002 SaSI) but has been re-introduced beginning in 1996 using Salmon Creek stock

Land Use: The upper watershed is composed of agricultural, forestry, and rural residential land use. The valley in the middle watershed is mostly composed of working farms. Toward the lower reaches, Chimacum Creek flows through more residential and commercial land. Overall, there are 3,046 acres zoned for agriculture in the watershed, representing about 14% of the total watershed area. Rural residential zoning is found in about 8,528 acres (38% of the watershed). A total of 152 acres of land is zoned commercial (0.7% of the total). The predominant residential zoning in this watershed (4,112 acres) is one residence per 20 acres. However, the lower watershed is located within the Tri-city areas of Chimacum, Irondale, and Port Hadlock, which are zoned at much higher densities.

#### Protection Activities Completed or Funded:

1. Watershed Analysis completed by Bahls and Rubin in 1996
2. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
3. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
4. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
5. Chumsortium has completed multiple purchases focused mostly on the lower watershed and estuary (overlapping summer chum distribution) in addition to multiple conservation easements upstream
6. Conservation Reserve Enhancement Program has been a key tool to implement multiple projects in agricultural areas

#### Restoration Activities Completed or Funded:

1. Mainstem (western fork) and tributaries
  - a. Jefferson County Conservation District and partners installed 48,216 feet of stock exclusion fencing
  - b. Instream restoration of 6,755 feet of stream channel
  - c. Riparian plantings in 22 acres
  - d. Bridge replacement
2. East Fork and tributaries
  - a. Jefferson County Conservation District and partners installed 21,102 feet of stock exclusion fencing
  - b. Instream restoration of 11,534 feet of stream channel
  - c. Riparian plantings over 50 acres
  - d. Culvert replacement
3. Funding has been awarded for restoration of the estuary and adjacent (south) nearshore (SRFB contract #00-1798)
4. Summer chum salmon stock re-introduction project using Salmon Creek stock

#### Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Continue restoration of natural riverine processes and functions
  - a. Restore sinuosity and natural channel configuration where possible in artificially-confined reaches
  - b. Restore stream channel habitat complexity through large woody debris addition
  - c. Restore wetlands and beaver ponds where appropriate and possible

- d. Plant and maintain riparian areas on both public and private properties
  - e. Control reed-canary grass
  - f. Continue assessment and long-term maintenance of livestock exclusion fencing
  - g. Address fish passage barriers
- 3. Assess/monitor water quality and habitat conditions
  - a. Assess, stabilize, monitor fine sediment sources
  - b. Assess fecal coliform & dissolved oxygen
  - c. Monitor temperature
  - d. Monitor water quality impacts of urbanization
  - e. Continue TFW ambient monitoring & mapping
- 4. Assess flows through WRIA 17 Planning Unit
  - a. Assess surface/ground water withdrawals for impact on summer low flow
  - b. Locate, monitor runoff sources
  - c. Monitor potential impacts from peak flows with scour chains

Naylor's Creek - WRIA 17.0208, a tributary to Chimacum Creek

Description: Flows into Chimacum Creek at River Mile 5.4. Flows go subsurface during summer low flows.

Stock Status: Coho, cutthroat

Land Use: Rural residential, agriculture /forestry

Restoration Activities Completed or Funded:

- 1. 5523 feet of livestock exclusion fencing
- 2. 2 acres of riparian plantings
- 3. Replaced culvert through JCCD and WOS/JFE

Potential Project List:

- 1. Restore sinuosity and natural channel/floodplain configuration
- 2. Replace county road culvert on West Valley Road (PI value: 26.91, ranked 9/84)

**LITTLE GOOSE CREEK – WRIA 17.0200A**

Description: flows into the northwest end of Oak Bay

Stock Status: coho

Land Use: Rural residential; forestry

Protection/Restoration Activities Completed: JCCD and WOS/NOSC provided 200 feet of stream restoration.

Potential Project List:

- 1. Maintain fish passage through county culvert at Oak Bay Road (PI value 10.93, ranked 31/84)
- 2. Restore original outlet to Little Oak Bay Lagoon

**PIDDLING CREEK - WRIA 17.0200**

Description: flows into Mats Mats Bay just south of Bayshore Road

Stock Status:

Land Use: Rural residential; forestry  
Protection/Restoration Activities Completed:

Potential Project List:

1. Restore fish passage at culvert on Oak Bay Road (PI value 9.53, ranked 36/84)

### **LUDLOW CREEK – WRIA 17.0192**

Description: flows into Port Ludlow Harbor southwest of the marina. The anadromous reach is about 0.5 miles in length due to a rarely passable cascade/falls.

Stock Status: coho, fall chum (volunteer surveys)

Land Use: residential, forestry, golf course

Protection/Restoration Activities Completed: Wild Olympic Salmon monitors spawning fish populations each fall/winter

Potential Project List:

1. Increase span on Paradise Bay Road to restore estuary function

### **UNNAMED CREEK – WRIA 17.0191**

Description: tightly constrained through lower reach due to riprap and lawns

Stock Status: unknown

Land Use: residential, forestry

Protection/Restoration Activities Completed: None

Potential Project List:

### **SHINE CREEK – WRIA 17.0181**

Description: Flows from forested wetlands southward and eastward and eventually through a large beaver pond to its estuary in Squamish Harbor

Stock Status: Coho

Land Use: Forestry

Protection/Restoration Activities Completed: Streambed stabilization adjacent to Hwy 104 (WOS)

Potential Project List:

1. Address siltation of right bank tributary running along the south side of Hwy 104
2. Restore estuary function by widening crossing span on South Point Road

### **BONES/HUBBARD CREEK – WRIA 17.0180**

Description: Small stream flowing through forested/residential area. Lower reach has been constricted with riprap

Stock Status: Coho (Port Gamble tribal biologist observations)

Land Use: Forestry, rural residential

Protection/Restoration Activities Completed: Streambed stabilization, LWD placement; Passage improvements (PGST with HCSEG funding)

Potential Project List:

1. Address erosion problem on south embankment of Hwy 104

### **THORNDYKE CREEK – WRIA 17.0170**

Description: Most of the watershed is owned by Olympic Resources, and is in long term forestry.

Stock Status: Coho, fall chum

Land Use: Forestry, rural residential

Protection/Restoration Activities Completed: Four culverts have been replaced on Olympic Resources lands; WOS incubated fall chum in two RSIs for several years (terminated brood year 2000)

Potential Project List:

1. Replace culvert on Thorndyke Road at milepost 4.71 (PI value of 39.04, ranked 2/84)
2. Underplant riparian with conifer

### **FISHERMAN HARBOR CREEK – WRIA 17.0153**

Description: Flows into Hood Canal at the southern end of Toandos Peninsula

Stock Status: Fall chum (local observations)

Land Use: Rural residential; forestry

Protection/Restoration Activities Completed: None

Potential Project List:

### **CAMP DISCOVERY CREEK – WRIA 17.0141**

Description:

Stock Status: Coho (Port Gamble tribal biologist observations)

Land Use: Forestry, rural residential

Protection/Restoration Activities Completed:

Potential Project List:

### **TARBOO CREEK - WRIA 17.0129**

Description: Tarboo Creek drains into Tarboo Bay at the head of Dabob Bay, west of the Toandos Peninsula. A detailed watershed assessment is currently underway by Northwest Watershed Institute.

Stock Status: Depressed - coho (2002 SaSI)  
Unknown - winter steelhead (2002 SaSI)  
Fall Chum present but not listed as stock in 2002 SaSI

Land Use: The majority of the land use is within commercial forestry, rural forestry, and in-holding forestry land use zones. There are no forestlands under federal ownership in this watershed. Washington State Department of Natural Resources owns forestlands in this basin. The lower watershed is composed of small farms and rural residential. The primary residential land use is one dwelling unit per twenty acres.

Protection/Restoration Activities Completed:

1. About 400 acres of estuary, associated shoreline riparian and lower mainstem areas of Tarboo Creek and Bay have been protected as a DNR Natural Areas Preserve.
2. Jefferson County Conservation District and Wild Olympic Salmon/Jobs for the Environment Crew have installed 18,570 feet of livestock exclusion fencing, restored natural riverine function to 1670 feet and planted 2 acres in riparian zone, funded by JCCD, JFE and NOSC.
3. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
4. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
5. Watershed Assessment by Northwest Watershed Institute
6. HCSEG, Jefferson County, and Port Gamble S'Klallam Tribe replaced culvert under Dabob Road (SRFB contract)
7. Jefferson County replaced culverts under Coyle Road
8. Multiple other culverts in upper watershed and lower tributaries have been replaced by NWI
9. HCSEG and partners will replace culvert under Center Road summer 2004 (SRFB contract)
10. Old Tarboo Road culvert to be replaced summer 2004 by NW and partners

Potential Project List:

1. Address blocking culverts: Coyle Road, E.F. (PI value 26.81, ranked 10/84); Coyle Road, E.F. (PI value 17.68, ranked 19/84)
2. Restore natural riverine function
  - a. Add channel sinuosity
  - b. Restore complexity, such as LWD
  - c. Riparian planting
3. Create access to pond
4. Protect remaining high priority parcels maintaining estuary and adjacent nearshore in Tarboo/Dabob Bay

**JAKEWAY CREEK – WRIA 17.0116**

Description:

Stock Status: Coho (local observations)

Land Use: Forestry, agriculture

Protection/Restoration Activities Completed: WOS/JFE and JCCD restored 1050 feet of natural riverine function and installed 3144 feet of livestock exclusion fencing

Potential Project List:

**DONOVAN CREEK - WRIA17.0115**

Description:

Stock Status:

Land Use:

Protection/Restoration Activities Completed: JCCD and WOS/JFE installed 6700 feet of livestock exclusion fencing.

Potential Project List:

1. Restore tidal flux by replacing culvert with bridge
2. Convert fill roadways to pile causeways
3. Remeander stream
4. Add LWD
5. Plant riparian area

## **LITTLE QUILCENE RIVER - WRIA 17.0076**

Description: The Little Quilcene drains into Quilcene Bay north of the Big Quilcene River. The watershed comprises 22,512 acres (about 35 square miles) in the northeastern corner of the Olympic Mountains and adjacent lowlands. There are three main left-bank tributaries in this watershed, including Howe, Ripley, and Leland Creeks.

Stock Status: See salmon distribution maps in Appendix A  
 Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing  
 Depressed - coho (2002 SaSI)  
 Healthy - late fall chum (2002 SaSI)  
 Unknown - winter steelhead (2002 SaSI)

Land Use: The Little Quilcene watershed is less protected than many other Hood Canal rivers. None of the watershed is located within Olympic National Park, although major portions of the upper watershed are located within the Olympic National Forest and benefit from the riparian reserve program. About 9,872 acres (44% of the total watershed) occur within the Olympic National Forest, and another 8,224 acres (36% of the total watershed) are zoned for privately-held forest land. There are 3,840 acres of rural residential zoning in the Little Quilcene watershed, 180 acres of agriculture, and five acres of commercially-zoned lands. The predominant residential zoning in this watershed (2,263 acres) is one residence per 20 acres.

### Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
2. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
3. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
4. 1,771 meters of road designated for decommissioning in 2003 USFS A&TM Plan (*but not funded*)
5. One large parcel has been acquired in the lower river and estuary by Jefferson County and the Department of Fish and Wildlife, partially funded by SRFB

### Restoration Activities Completed or Funded:

1. 17,729 meters of USFS roads decommissioned

### Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of federal ownership where appropriate. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)

3. Re-establish functional link between estuary and freshwater habitat
  - a. Restore sinuosity and functional estuary/freshwater link including removal of estuarine levees
  - b. Address artificially aggraded delta cone sediments
4. Restore natural riverine processes and functions
  - a. Restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches of the mainstem by removing riprap and levees
  - b. Update floodplain and channel migration maps
  - c. Restore stream channel and floodplain habitat complexity through key large woody debris and log jam addition
  - d. Plant and maintain riparian areas on both public and private properties
5. Assess, stabilize, monitor sediment sources
  - a. Identify, abate and monitor sediment source
  - b. Implement USFS A&TM Plan (see above)
  - c. Review and improve road maintenance plans to reduce sediment inputs
  - d. Quantify severity of scour problem
6. Hydrologic & flow studies through WRIA 17 Planning Unit
  - a. Assess hydrologic continuity between groundwater and surface water
  - b. Build watershed hydrologic model
  - c. Assess and address minimum necessary summer low flow

#### Leland Creek - WRIA 17.0077, a tributary to the Little Quilcene River

Description: Leland Creek drains a valley bottom of wetlands and Leland Lake. The SR101 road prism and associated water quality issues impact much of the watershed.

Stock Status: Coho, cutthroat

Land Use: Rural residential, agriculture

Restoration Activities Completed or Funded:

1. JCCD installed 3,599 feet of livestock exclusion fencing with 3 property owners
2. Removal of the Lake Leland water control structure, a potential fish passage barrier

Potential Project List:

1. Restore natural riverine processes and functions
  - a. Restore sinuosity and natural channel/floodplain configuration
  - b. Replace unnamed tributary culvert under Leland Valley Rd. W. (PI value 14.52, ranked 22/84, design work has been completed by Jefferson County)
  - c. Address reed canary grass problem
  - d. Plant and maintain riparian areas on both public and private properties
2. Address reed canary grass problem in Lake Leland

#### **BIG QUILCENE RIVER – WRIA 17.0012**

Description: The Big Quilcene River drains into Quilcene Bay near the Little Quilcene River, located in the northwest portion of Hood Canal. The Big Quilcene River has a watershed area of about 44,786 acres (about 70 square miles). Eighty-five percent of the watershed is in federal ownership. The Buckhorn Wilderness Area occupies about 30% of the watershed. As with



other east Olympic Mountain drainages, it has a bimodal hydrology with winter and spring peaks.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing and limited but historically significant spawning (but not identified as a stock under 2002 SaSI)  
Depressed - coho (2002 SaSI)

Healthy - late fall chum (2002 SaSI)

Unknown - winter steelhead (2002 SaSI)

NOTE: Summer chum supplementation program, 1992-2003; supported reintroduction of summer chum to Big Beef Creek, 1996-2000.

Land Use: The community of Quilcene is located in, and adjacent to, the 100-year floodplain of the Big Quilcene River. Rural residential zoning occupies approximately 4% of the watershed. Commercial zoning occupies a total of 48 acres (0.1% of the watershed). There are 22 acres of light industrial zoning located just outside of the Quilcene “downtown-core” community. The predominant residential zoning in this watershed (979 acres) is one residence per five acres.

Protection Activities Completed or Funded:

1. Olympic National Forest Watershed Analysis completed in November 1994
2. Washington Conservation Commission WRIA 17 Limiting Factors Analysis for riverine and nearshore November 2002
3. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
4. Designated as a Key Watershed by USFS (high priority anadromous salmon restoration)
5. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
6. 8,235 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (but not funded)
7. 20,253 meters of road designated for decommissioning in 2003 USFS A&TM Plan (but not funded)
8. Jefferson County's Linger Longer Feasibility Study, funded by SRFB, is currently planning and implementing protection and restoration for the lower river and estuary portions of Big Quilcene River
9. Multiple parcels have been acquired in the lower river and estuary by Jefferson County and the Department of Fish and Wildlife, partially funded by SRFB
10. The Skokomish Tribe is pursuing a conservation easement for a portion of the Baclawski property just downstream of SR101 bridge. 7 acres of this property have been re-vegetated through the Conservation Reserve Enhancement Program (CREP)

Restoration Activities Completed or Funded:

1. 47,827 meters of USFS roads decommissioned
2. Between 0.5 and 0.75 miles of stream improved with LWD addition in Port Townsend Creek in early 1990s
3. JCD, WDFW, and Jefferson County removed 800 feet of levee on County property in the estuary in August 1994
4. JCD, WOS, and JFE completed 2800 feet of stream enhancement, 500 feet of livestock fencing, and 0.2 acres of riparian plantings in middle reaches of Big Quilcene River
5. JCD, WOS, and JFE completed 300 feet of levee setback, LWD addition, and riparian planting by JCD, WOS, and JFE at Hiddendale just above USFWS hatchery

6. The Skokomish Tribe has installed an engineered log jam (ELJ) on the Baclawski property just below SR101 bridge. A second ELJ is being planned

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitat
  - a. Address dike and road impacts in lower reach as determined by Linger Longer Feasibility study
  - b. Restore sinuosity and functional estuary/freshwater link including removal of estuarine levees
  - c. Address artificially aggraded delta cone sediments
4. Restore natural riverine processes and functions
  - a. Restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches of the mainstem by removing riprap and levees
  - b. Restore fish passage above USFWS hatchery electric weir
  - c. Restore stream channel and floodplain habitat complexity through key large woody debris and log jam addition
  - d. Plant and maintain riparian areas on both public and private properties
  - e. Assess Penny Creek diversion/culvert modification for passage at USFWS hatchery and restore
5. Monitor and address mass wasting, as per watershed analysis
  - a. Identify, abate and monitor sediment source
  - b. Quantify severity of scour problem
  - c. Implement USFS A&TM Plan (see above)
  - d. Review and improve road maintenance plans to reduce sediment inputs
6. Hydrologic & flow studies (WRIA 17 Planning Unit)
  - d. Assess hydrologic continuity between groundwater and surface water
  - e. Build watershed hydrologic model
  - f. Assess minimum necessary summer low flow
  - g. Address summer low flow

Penny Creek - WRIA 17.0014, a tributary to the Big Quilcene River

Description:

Stock Status:

Land Use:

Protection/Restoration Activities Completed:

Potential Project List:

1. Assess diversion/culvert modification for passage

**INDIAN GEORGE CREEK - WRIA 17.0011**

Description: Small independent tributary to the west side of Quilcene Bay just south of the Big Quilcene River. The estuary is in public ownership (Washington Department of Fish and Wildlife) for the purpose of shellfish harvest.

Stock Status: Coho

Land Use: Forestry, rural residential

Protection/Restoration Activities Completed:

1. Restore channel complexity along 623 feet of lower stream (Wild Olympic Salmon/Jobs for the Environment Crew, Jefferson Conservation District)
2. WDFW and Hood Canal Salmon Enhancement Group received SRFB, ALEA and NFWF funding for estuary restoration and completed the project in 2001

Potential Project List

1. Stabilize sediment sources in upper reaches
2. Restore riparian

#### **SPENCER CREEK – WRIA 17.0004**

Description:

Stock Status: Fall chum, coho (local observation)

Land Use:

Protection/Restoration Activities Completed:

Potential Project List:

1. Address sediment inputs

#### **MARPLE CREEK – WRIA 17.0001**

Description:

Stock Status:

Land Use:

Protection/Restoration Activities Completed:

Potential Project List:

## **JEFFERSON COUNTY/WRIA 16 DRAINAGES**

### **TURNER CREEK – WRIA 16.0559**

Description:

Stock Status:

Land Use:

Protection/Restoration Activities Completed

Potential Project List:

### **DOSEWALLIPS RIVER - WRIA 16.0440**

Description: The Dosewallips River is the largest river in Jefferson County within the Hood Canal summer chum and Puget Sound Chinook ESUs. The Dosewallips River flows into the Hood Canal from the Olympic Mountains, draining a watershed area of approximately 74,412 acres (approximately 116 square miles) and with an average annual discharge of 446 cubic feet per second at river mile 7.1. As with other east Olympic Mountain drainages, it has a bimodal hydrology with winter and spring peaks.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (critical in 2002 SaSI) as part of Mid-Hood Canal Chinook stock

Healthy – fall/late fall chum (2002 SaSI)

Depressed - pink, winter steelhead (2002 SaSI)

Unknown – coho, summer steelhead (2002 SaSI)

Land Use: The largest landowners in the Dosewallips River watershed are the Olympic National Park (47,231 acres) and the Olympic National Forest (22,028 acres), which together comprise 93% of the watershed. A significant portion of the National Forest land is protected as wilderness area. Due to budgetary constraints, however, the USFS has not been able to properly maintain and/or decommission forest roads particularly in the Rocky Brook drainage, thereby increasing the threat of future sedimentation problems. The remaining 7% is divided between privately-held forest lands, rural residential, park land and commercial uses. There are 34 acres of commercial zoning in the watershed, which is concentrated in the lower reaches. The predominant residential zoning in this watershed (678 acres) is one residence per 20 acres. The rural village center of Brinnon is located at the mouth of the river on what was historically an active alluvial delta.

Protection Activities Completed or Funded:

1. Dosewallips Watershed Assessment in progress by Port Gamble S'Klallam Tribe
2. Olympic National Forest Watershed Analysis completed in February 1999
3. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
4. WRIA 16 Salmonid Refugia Report 2003 (SRFB contract#00-1829)
5. Washington Conservation Commission WRIA 16 Limiting Factors Analysis for riverine and nearshore June 2003
6. Designated as a Key Watershed by USFS (high priority anadromous salmon restoration)
7. Ecosystem Diagnosis and Treatment completed for Chinook and on-going for summer chum (*but not fully funded*)

8. Majority of estuary and existing distributary sloughs owned by Washington State Parks
9. Upper Sylopash Slough acquisition funded (SRFB contract#02-1482)
10. 7721 meters of road designated for decommissioning in 2003 USFS A&TM Plan (all in Rocky Brook) (but not funded)
11. 2581 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (mainstem) (but not funded)

Restoration Activities Completed or Funded:

1. 14,187 meters of USFS roads decommissioned (all in Rocky Brook)
2. Dosewallips Estuary Restoration Project funded by SRFB in 2003
3. HCSEG Highway SR101 Causeway Study (SRFB contract #00-1806), revised draft completed August 2003

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Assess and abate constriction at SR101 causeway
  - b. Remove levees and fill to restore processes which form and maintain tidal marsh and tidal channel habitats
  - c. Reconnect tide lands, wetlands, and freshwater sources
  - d. Remove barge abandoned on tidelands south of mouth
4. Restore natural riverine processes and functions
  - a. Restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches of the mainstem by removing riprap and levees
  - b. Restore stream channel and floodplain habitat complexity through key large woody debris and log jam addition
  - c. Plant and maintain riparian areas on both public and private properties
5. Assess, stabilize, and monitor fine and course sediment sources
  - a. Implement USFS A&TM Plan (see above)
  - b. Review and improve road maintenance plan to reduce sediment inputs
  - c. Review current sediment contributions from Rocky Brook subwatershed and other areas

**WALKER CREEK - 16.0441**

Description: steep gradient  
 Stock Status: coho, chum present  
 Land Use:  
 Protection/Restoration Activities Completed:

Potential Project List

## DUCKABUSH RIVER - WRIA 16.0351

Description: The Duckabush River is along the southern boundary of Jefferson County (near Mason County) and is within the Hood Canal summer chum and the Puget Sound Chinook ESUs. The watershed comprises approximately 49,970 acres (about 78 square miles). The annual average discharge is 411 cubic feet per second at RM 4.9. As with other east Olympic Mountain drainages, it has a bimodal hydrology with winter and spring peaks.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (critical in 2002 SaSI) as part of Mid-Hood Canal Chinook stock  
Depressed – pink, winter steelhead (2002 SaSI)  
Healthy – coho, fall/late fall chum (2002 SaSI)  
Unknown – summer steelhead (2002 SaSI)

Land Use: The Duckabush River watershed is similar to that of the Dosewallips River. Approximately 28,875 acres are within Olympic National Park and 15,681 acres are within Olympic National Forest, together comprising 89% of the watershed area. Due to budgetary constraints, however, the USFS has not been able to properly maintain and/or decommission forest roads, thereby increasing the threat of future sedimentation problems. The remaining watershed is zoned for privately-held forest lands (3,725 acres), rural residential land use (1,414 acres), and parks (134 acres). There is no commercial or industrial-zoned land in the Duckabush River watershed. The predominant residential zoning in this watershed (863 acres) is one residence per five acres.

### Protection Activities Completed or Funded:

1. 124+ acres of estuary and tidelands purchased by WDFW in 1970s
2. Olympic National Forest Watershed Analysis completed in May 1998
3. Washington Conservation Commission WRIA 16 Limiting Factors Analysis for riverine and nearshore June 2003
4. East Jefferson County Salmonid Refugia Report 2003 (SRFB contract#00-1816)
5. WRIA 16 Salmonid Refugia Report 2003 (SRFB contract#00-1829)
6. 100% of USFS land is under Wilderness, Late Successional Reserve, or Adaptive Management for Research (0.01%) designation
7. Designated as a Key Watershed by USFS (high priority anadromous salmon restoration)
8. Ecosystem Diagnosis and Treatment completed for Chinook and on-going for summer chum (*but not fully funded*)
9. 13048 meters of road (13 segments) designated for decommissioning in 2003 USFS A&TM Plan (but not funded)
10. 1205 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (but not funded)

### Restoration Activities Completed or Funded:

1. HCSEG Highway SR101 Causeway Study (SRFB contract #00-1806), revised draft completed August 2003

### Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and

mainstem floodplain downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.

2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see Estuary map in Appendix A for location and lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Remove earthen causeway at SR101 to restore estuarine process and function
  - b. Remove wood armor placed at top of historic distributary channel during construction of SR101 in 1930's; restore channel
  - c. Remove levees and fill to restore tidal marsh and tidal channel habitats
  - d. Restore connectivity of Pierce Creek adjacent to Duckabush Fire Station
  - e. Control exotic vegetation and re-vegetate native plants in estuary
4. Restore natural riverine processes and functions
  - a. Restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches downstream of BPA power lines by removing riprap, bulkheads and fill, which may require purchase of residential lots
  - b. Restore stream channel habitat complexity through key large woody debris and log jam addition in mainstem and through large woody debris addition in the Murhut/Cliff subwatershed
  - c. Plant and maintain riparian areas on both public and private properties in lower mainstem and in the Murhut/Cliff subwatershed.
5. Assess, stabilize, and monitor fine and course sediment sources
  - a. Implement USFS A&TM Plan (see above)
  - b. Review and improve road maintenance plan to reduce sediment inputs
  - c. Review current sediment contributions from Murhut/Cliff subwatershed and other sediment sources

#### **MCDONALD CREEK – WRIA 16.0349**

Description: steep gradient  
Stock Status: coho, chum present  
Land Use:  
Protection/Restoration Activities Completed:

Potential Project List

#### **FULTON CREEK – WRIA 16.0332**

Description: steep gradient  
Stock Status: coho, chum present  
Note: unknown, but possible, former occurrences of summer chum (WDFW and PNPTT 2000)

Land Use:  
Protection/Restoration Activities Completed:

Potential Project List:

#### **SCHAERER CREEK – WRIA 16.0326**

Description: steep gradient  
Stock Status: coho, chum present

Land Use:

Potential Project List:

**WAKETICKEH CREEK – 16.0318**

Description: 6.6 mainstem miles;

Stock Status: coho, chum present

Land Use:

Potential Project List:



## MASON COUNTY/WRIA 16 DRAINAGES

### HAMA HAMA RIVER - WRIA 16.0251

Description: The watershed is about 85 square miles, with 18 miles mainstem and 93 miles of tributary habitat. This river originates in the eastern Olympic Mountains, flows east through steep forested terrain, and enters Hood Canal at Eldon. Anadromous species are confined to the lower 2 miles of mainstem and lower 1.8 miles of Johns Creek (a lower mainstem tributary). There are two annual runoff peaks, one in November to February due to rains, and one in the spring due to snow melt.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (depressed in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (critical in 2002 SaSI) as part of Mid-Hood Canal Chinook stock

Healthy – fall/late fall chum, pink (2002 SaSI)

Depressed – winter steelhead (2002 SaSI)

Unknown – coho (2002 SaSI)

NOTE: Supplementation programs for Chinook, summer chum and winter steelhead are currently underway.

Land Use: 95% public ownership (60% managed forest, 34% national park or wilderness); 5% private (mainly commercial forest with some agriculture and residence in lower 1.5 miles).

Factors for Decline: lack of channel complexity; removal of LWD from 1950s to present; bed instability; sedimentation and aggradation in lower Johns Creek at least partially as a result of landslides associated with road failures and clearcutting; dredging; bank hardening; poor riparian widths and composition along the majority of the river; dredging and diking in estuary (48 acres summer chum rearing habitat lost); road construction at Highway 101 restricts tidal action; isolation of estuarine marsh from main river.

Protection Activities Completed or Funded:

1. USFS Watershed Analysis completed in July 1997
2. Washington Conservation Commission WRIA 16 Limiting Factors Analysis for riverine and nearshore June 2003
3. WRIA 16 Salmonid Refugia Report 2003 (SRFB contract#00-1829)
4. Ecosystem Diagnosis and Treatment completed for Chinook and on-going for summer chum (*but not fully funded*)
5. 34,519 meters of road (23 segments) designated for decommissioning in 2003 USFS A&TM Plan (but not funded)
6. 9217 meters of road (4 segments) designated for conversion to trail in 2003 USFS A&TM Plan (but not funded)

Restoration Activities Completed or Funded:

1. 8891 meters of USFS roads decommissioned
2. Rearing ponds constructed by HCSEG
3. HCSEG Highway SR101 Causeway Study (SRFB contract #00-1806), revised draft completed August 2003

Potential Project List:

1. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
2. Re-establish functional link between estuary and freshwater habitats
  - a. Remove earthen causeway at SR101 to restore estuarine process and function
  - b. Reestablish historic distributary and tidal channels lost during construction of SR101 and mainstem levees
  - c. Remove levees and fill to restore tidal marsh and tidal channel habitats
  - d. Control exotic vegetation and re-vegetate native plants in estuary
3. Restore natural riverine processes and functions
  - a. Restore natural channel-forming processes and floodplain connectivity in artificially-confined reaches of lower mainstem and John's Creek by removing riprap and levees
  - b. Restore stream channel habitat complexity through key large woody debris and log jam addition
  - a. Assess, protect, and restore riparian conditions
    - i. Anadromous zone
    - ii. Above anadromous zone as recommended in Watershed Analysis pages 2.6-18 to 2.6-19
    - iii. Lake riparian areas damaged by recreation (see Watershed Analysis)
    - iv. Silviculture treatment of upland problem areas, with emphasis on Jefferson and Cabin Creek watersheds, to increase hydrologic maturity
4. Assess, stabilize, and monitor fine and course sediment sources
  - a. Implement USFS A&TM Plan (see above), with emphasis on Jefferson and Cabin Creeks
  - b. Support efforts to decommission and/or repair roads on private lands
  - c. Abandon logging on steep slopes
  - d. Review and improve road maintenance plan to reduce sediment inputs

**JORSTED CREEK - WRIA 16.0248**

Description: stream length is 3.8 miles

Stock Status: Healthy: coho, fall chum (2002 SaSI)

Land Use: forestry;

Factors for Decline: summer low flows; sediment; Highway 101 constriction.

Potential Project List:

1. Restore estuary function
  - a. Assess/modify Highway 101
  - b. Soften shoreline where necessary
2. Develop local stewardship program

**EAGLE CREEK - WRIA 16.0243**

Description: mainstem is 3.2 miles with an additional 5.3 miles tribs

Stock Status: Healthy: coho, fall chum (2002 SaSI)

NOTE: Chinook and fall chum enhancement project has been terminated

Note: unknown, but possible, former occurrences of summer chum (WDFW and PNPTT 2000)

Land Use:

Factors for Decline: summer low flows; Highway 101 impacts; removal of historical connection to salt marsh.

Potential Project List:

1. Restore estuary function
  - a. Assess/modify Highway 101

### **LILLIWAUP CREEK - WRIA 16.0230**

Description: The Lilliwaup watershed is about 17.9 square miles with 6.9 miles of mainstem and 10.8 miles of tributary habitat. It originates in extensive wetlands associated with Price Lake in upper Lilliwaup Valley, flows through high gradient habitat, down an impassable falls at RM 0.7, and through a well-developed floodplain to the estuary.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (critical in 2002 SaSI); Puget Sound Chinook salmon rearing  
Healthy – coho; late fall chum (2002 SaSI)  
NOTE: Summer chum supplementation program, 1992 to present

Land Use: 89% of the watershed is in public forest, 7% in private forest, and 2% in residential.

Factors for Decline: forest practices; lack of channel complexity due to low LWD; riparian degradation; channelization for development; road impacts.

Protection Activities Completed or Funded:

1. USFS Watershed Analysis completed in July 1997
2. Washington Conservation Commission WRIA 16 Limiting Factors Analysis for riverine and nearshore June 2003
3. WRIA 16 Salmonid Refugia Report 2003 (SRFB contract#00-1829)
4. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)

Restoration Activities Completed or Funded:

1. HCSEG Highway SR101 Causeway Study (SRFB contract #00-1806) , revised draft completed August 2003
2. Summer chum supplementation program, 1992 to present

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of the falls/anadromous barrier where appropriate. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitat
  - a. Assess and address Highway SR101 causeway impacts
4. Restore natural riverine processes and functions
  - a. Conduct habitat surveys in anadromous reach

- b. Restore stream channel and floodplain habitat complexity through key large woody debris and log jam addition
  - c. Plant and maintain riparian areas on both public and private properties
- 5. Monitor and address mass wasting, as per watershed analysis
  - a. Review and improve road maintenance plans to reduce sediment inputs
  - b. Assess channel stability
  - c. Protect upper watershed wetlands and assess relationship to summer low flows

#### **LITTLE LILLIWAUP CREEK - WRIA 16.0228**

Description: stream is 1.05 miles in mainstem length; good year-around flows

Stock Status: Healthy: coho, fall chum (2002 SaSI)

Summer Chum salmon observed historically and currently (but sporadic)

Land Use:

Factors for Decline: low flows; Highway 101 impacts.

Potential Project List:

- 1. Restore estuary function
  - a. Assess/modify Highway 101

#### **SUND CREEK - WRIA 16.0226**

Description: seasonal stream (Nov-May); natural limitation is summer low flow; stream length is 2.7 miles

Stock Status: Healthy - fall chum, coho (2002 SaSI)

Land Use:

Factors for Decline: shoreline development in anadromous reach

Potential Project List:

#### **MILLER CREEK - WRIA 16.0225**

Description: seasonal stream (Nov-May); summer low flow is a natural limitation; stream length is 2.7 miles

Stock Status: Healthy - fall chum, coho (2002 SaSI)

Land Use:

Factors for Decline: shoreline development in the anadromous reach

Potential Project List:

#### **CLARK CREEK - WRIA 16.0224**

Description: seasonal stream (Nov-May); natural summer low flow is a limitation; stream length is 1.4 miles

Stock Status: Healthy - fall chum, coho (2002 SaSI)

Land Use:

Factors for Decline: Highway 101 crossing;

Potential Project List:

1. Modify Highway 101 culvert for fish passage

#### **FINCH CREEK - WRIA 16.0222**

Description: stream length is 3.3 miles

Stock Status: Healthy: coho, fall chum;

summer chum population present historically but extirpated

Land Use: WDFW hatchery at mouth; rural residential

Factors for Decline: anthropogenic constrictions such as shoreline development and the Hoodspout hatchery;

Potential Project List:

1. Provide fish passage beyond the hatchery and its intake
2. Add complexity

#### **HILL CREEK - WRIA 16.0221**

Description: stream length is 1.0 mile; steady flows all year;

Stock Status: Healthy: coho, fall chum

Land Use:

Factors for Decline:

Potential Project List:

#### **ENETAI CREEK - WRIA 16.0216**

Description: good flows all year;

Stock Status: coho (tribal biologist)

Land Use: Tribal hatchery at mouth

Factors for Decline:

Potential Project List:

#### **MINERVA CREEK – WRIA 16.0215**

Description: seasonal stream (Nov-May); stream length is 2.7 miles

Stock Status: Healthy – fall chum, coho (1992 SASSI)

Land Use:

Factors for Decline: cement ditch

Potential Project List:

## **SKOKOMISH RIVER - MAINSTEM - WRIA 16.0001**

**Skokomish (16.0001) Tributaries:** Purdy Creek (16.0005); Weaver Creek (16.0006); Hunter Creek (16.0007); Richert Springs (16.0010); ,

**South Fork Skokomish River (16.0011), Tributaries:** Vance Creek (16.0013)

Description: The Skokomish watershed is about 240 square miles with 80 miles of mainstem and over 260 miles of tributaries. It drains the southeast corner of the Olympic Mountains and has the largest estuary and intertidal delta in the Hood Canal Basin. The watershed consists of three major drainages: mainstem Skokomish and North Fork (33.3 miles), South Fork (27.5 miles) and Vance Creek (11 miles). The North Fork originates in Olympic National Park, flows through Lake Cushman, and through a spillway to the City of Tacoma Power Generating Facility on Hood Canal, with only 60 cfs remaining in the historic river channel (historical peak flows were 700 cfs). The South Fork also originates in Olympic National Park, but flows through a larger proportion of public and private commercial forest before entering the residential areas of the lower Skokomish Valley. The North Fork and South Fork join to form the mainstem at RM 9, flowing through a wide alluvial valley and through the Skokomish Indian Reservation to the estuary/delta. Vance Creek flows through public and private commercial forest, and eventually through residential/small farms to the South Fork at RM 0.8 (just above confluence with North Fork). Richert Springs is a spring-fed system of channels entering the mainstem at RM 7.9. Hunter, Weaver and Purdy Creeks, all spring fed, enter the mainstem at RM 6.2, 4.1 and 3.6 respectively, each with state fish hatcheries.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum salmon extirpated, but with occasional sightings and rearing in the estuary; Puget Sound Chinook salmon rearing and spawning (depressed in 2002 SASI); Bull Trout Depressed - winter steelhead (2002 SaSI)  
Healthy - upper river fall/late fall chum, coho (2002 SaSI)  
Unknown - lower river fall/late fall chum, summer steelhead (2002 SaSI)

Land Use: Two hydropower facilities are located on the North Fork (RM 17.3 and 19.6). The South Fork and Vance Creek are dominated by commercial forestry, small farms, and rural residents.

Factors for Decline: reduced flows due to hydropower on North Fork (FERC flows of 228 cfs is 28% of average annual flow and is too low to support recovery of fish resources; 84% should be the minimum, according to EPA); warm water temps due water withdrawals (including hydroelectric); increased sediment delivery from intensive forestry and roads in upper South Fork and Vance Creeks; reduced sediment transport due low flows; loss of estuary/eelgrass habitat; dikes/levees; roads/causeways; channel complexity due removal of LWD, draining of side channels; bed instability due to channelization/dikes and storm flows; increased peak flows due forest practices; channel aggradation, flooding, dredging cycle; degraded riparian condition; water quality problems from septic systems and livestock.

Protection Activities Completed or Funded:

1. USFS Watershed Analysis completed in 1995
2. Army Corps of Engineers Early Action Study in 1995

3. Skokomish River Comprehensive Flood Hazard Management Plan by Mason County (KCM) in April 1996
4. Washington State DNR and Simpson Timber Company Watershed Analysis 1997
5. 905(b) Army Corps of Engineers Reconnaissance Study in 2000
6. Washington Conservation Commission WRIA 16 Limiting Factors Analysis for riverine and nearshore June 2003
7. WRIA 16 Salmonid Refugia Report 2003 (SRFB contract#00-1829)
8. Designated as a Key Watershed by USFS (high priority anadromous salmon restoration)
9. Ecosystem Diagnosis and Treatment on-going for summer chum in estuary/nearshore (*but not fully funded*)
10. Skokomish Mainstem
  - a. Skokomish Salmon Recovery Team (SRFB contract #99-1652)
  - b. Skokomish River Acquisition (SRFB contract #01-1387)
  - c. Bourgalt Acquisition of 165 acres
11. Skokomish North Fork
  - a. 9887 meters of road designated for decommissioning in 2003 USFS A&TM Plan (*but not funded*)
  - b. 3920 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (*but not funded*)
12. Skokomish South Fork
  - a. 83,587 meters of road designated for decommissioning in 2003 USFS A&TM Plan (*but not funded*)
  - b. 9523 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (*but not funded*)
13. Vance Creek
  - a. 6336 meters of road designated for decommissioning in 2003 USFS A&TM Plan (*but not funded*)
  - b. 0 meters of road designated for conversion to trail in 2003 USFS A&TM Plan (*but not funded*)

Restoration Activities Completed or Funded:

1. Skokomish Mainstem and Estuary
  - a. Skokomish River North Channel Oxbow and Plan (SRFB contract #99-1679 and 99-1689)
  - b. Bourgalt/North Channel Reconnection (SRFB contract #00-1081)
  - c. Nalley Slough Tide Gate and Levee Removal (Phase 1 – SRFB contract #01-1302)
  - d. Nalley Island Levee Removal (Phase 2 – SRFB contract #02-1560)
  - e. Nalley Slough Reconnection
  - f. Skabob Creek Bridge on Reservation Road
  - g. Skabob Creek Culvert Replacement with Bridge on SR106
  - h. Various levee setbacks?
2. Skokomish North Fork
  - a. 4660 meters of USFS roads decommissioned
3. Skokomish South Fork
  - a. 133,167 meters of USFS roads decommissioned (including LeBar Creek – SRFB contract #01-1426)
  - b. Brown's Creek USFS Campground relocation
  - c. Rearing ponds constructed within floodplain and anadromous zone of South Fork, LeBar Creek, and Brown Creek in "bathtub" area (1994-5)

- d. Riparian plantings and conifer release in anadromous zone of South Fork, LeBar Creek, and Brown Creek in “bathtub” area (1994-5)
- 4. Vance Creek
  - a. 42,347 meters of USFS roads decommissioned
  - b. Riparian plantings in lower mainstem

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of federal ownership. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Modify dikes and tidegates
  - b. Reestablish tidal sloughs
  - c. Reconnect freshwater sloughs and wetlands
  - d. Monitor agriculture conversion to estuary habitat
4. Restore natural riverine processes and functions
  - a. Synthesize existing physical channel hydrologic/hydraulic studies and determine cost effective options
  - b. Improve hydrology and sediment regime in North Fork Skokomish
  - c. Restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches by setting back levees and removing armor
    - i. Assess/modify SR101 causeway
    - ii. Assess/modify SR106 causeway
    - iii. Reconnect freshwater wetlands and side channels
  - d. Restore stream channel habitat complexity through key large woody debris and log jam addition in mainstem and through large woody debris addition
  - e. Plant and maintain riparian areas on both public and private properties
    - i. Encourage forestry rather than conversion
5. Assess, stabilize, abate, and monitor fine and coarse sediment sources
  - a. Reduce sediment from roads
  - b. Avoid timber harvest on steep slopes
  - c. Remove/repair logging roads
  - d. Monitor bed scour (multiple tribs) and bed stability
  - e. Assess impacts and determine alternatives for improving excessive gravel conditions in South Fork Skokomish and Vance Creek
6. Conduct more extensive summer chum salmon surveys



## **MASON COUNTY/WRIA 14 DRAINAGES**

### **ALDERBROOK/BIG BEND CREEK - WRIA 14.0138**

Description: This stream is composed of a mainstem and three contributing drainage tributaries totaling about 2 miles of habitat. The main stem habitat zone begins in a two-acre pond and continues through a mixed conifer/deciduous forest. The first tributary enters the main stem about three hundred meters below the head of the habitat zone and the other two tributaries enter within 200 meters of the mouth of the stream.

Stock Status: Fall chum (healthy in 2002 SaSI). Coho and cutthroat are present; status is unknown

Land Use: some rural residential development

Factors for Decline: potential uppermost habitat reach limited by presence of largemouth bass

Potential Project List:

1. Eliminate largemouth bass from uppermost reach

### **TWANOH CREEK - WRIA 14.0134**

Description: Twanoh Creek is a springfed stream, of which the mainstem is approximately 1.3 miles in length. Tributaries contribute an additional 0.4 miles.

Stock Status: Fall chum (healthy in 2002 SaSI). Cutthroat are present while status is unknown.

Land Use: State park/recreation including camping, public beach access and boat launch facilities. Fall chum are the focus of an educational kiosk in the park, which provides excellent viewing of salmon returning to a small stream system. This park could provide an excellent public "forum" in which to focus more watershed education.

Factors for Decline: Riparian area in lower 400 meters of stream is degraded from proximity of parking and day use areas. This area lacks a natural succession to the riparian area. A footpath/trail follows the stream from the mouth to nearly the headwaters. To the east of the highway, a multi-space campground area is adjacent to one side of the stream. In the area of the campground, campsites adjacent to and within the riparian area have created some erosion from public traffic resulting in a potential increase in sedimentation. There is also a lack of recruitment of LWD in this portion of the creek.

Potential Project List:

1. Assess, protect, and restore riparian, including canopy diversity
  - a. Provide overlook access points to minimize user impact on riparian area.
2. Establish a higher profile education component to compliment watershed wide restoration efforts.

### **UNNAMED – WRIA 14.0133**

Description: stream is less than 0.5 miles in length

Stock Status: Unknown

Land Use:  
Factors for Decline:

Potential Project List:

### **FOREST BEACH CREEK - WRIA 14.0132**

Description: The mainstem of Forest Beach Creek is approximately 1.6 miles in length. Contributing tributaries add an additional 0.8 miles to the watershed.

Stock Status: Coho and cutthroat are present; status is unknown.

Land Use: Residential

Factors for Decline: The stream reach below a culvert barrier (at approximately 500 meters) is lightly to moderately impacted by family residences as well as a community beach. The stream reach above the culvert barrier exists in a normative state. Although several structures in the lower reach indicate restricted access for fish movement, the upper culvert is a complete blockage. The culvert (lower) at Highway 106 is inadequate for the natural movement of the streambed and acts as a barrier to fish movement during high flows. This culvert is often in need of gravel removal since it routinely fills with sediment and floods the highway during substantial rain events. The lower reaches of the stream have documented high fecal coliform measurements. Failing septic systems as well as multiple dog kennels along the lower portion of the stream likely have impacted the water quality. Oil and petroleum products have been noted near the stream from landowner activity.

Potential Project List:

1. Assess stream for salmon habitat
2. Replace man-made barriers for fish passage
3. Assess, protect, and restore riparian, including canopy diversity with the focus on the lower portion of the stream.
4. Assess, stabilize, and monitor sediment sources with the focus on the lower reaches.
5. Monitor water quality.

### **UNNAMED – WRIA 14.0131**

Description: stream is less than 0.5 miles in length

Stock Status: Unknown

Land Use:

Factors for Decline:

Potential Project List:

### **UNNAMED – WRIA 14.0130**

Description: impassable natural barrier at approximately River Mile 0.2.

Stock Status: Unknown

Land Use:

Factors for Decline:

Potential Project List:

### **HAPPY HOLLOW – WRIA 14.0129**

Description: This creek is approximately 1.1 miles long, which appears to drain an upper marshy wetland area. The well-shaded riparian area is composed of mixed conifer/deciduous forest with diverse canopy structure throughout its entire length. The stream guide shows an impassable natural barrier at approximately River Mile 0.3.

Stock Status: Coho and cutthroat are present; status is unknown.

Land Use: Some residential development at the lower portion of the creek.

Factors for Decline:

Potential Project List:

1. Assess the stream for salmonid habitat.
2. Assess and monitor sediment sources.
3. Monitor water quality.

### **UNNAMED – WRIA 14.0128**

Description: stream is less than 0.5 miles in length

Stock Status: Unknown

Land Use:

Factors for Decline:

Potential Project List:

### **HOLYOKE CREEK - WRIA 14.0127**

Description: The mainstem of the stream is approximately 1.8 miles long with small tributaries contributing approximately 0.85 miles.

Stock Status: Fall chum, coho and cutthroat are present; status is unknown

Land Use: family residences on the lower reaches of the stream lightly impact the stream. Previous logging activity is evident in the upper portions of the stream, although the riparian area remains normative.

Factors for Decline: Potential for increased sedimentation due to logging activity.

Potential Project List:

1. Assess stream for salmonid habitat.
2. Assess and monitor sediment sources.
3. Monitor water quality.

## **LAKEWOOD CREEK – WRIA 14.0126**

Description: The mainstem of the stream is approximately 1.2 miles. Tributaries contribute about 0.9 miles. The stream flows through some undeveloped areas as well as low developed residential areas.

Stock Status: Coho and cutthroat are present; status is unknown.

Land Use: Rural residential development

Factors for Decline: The stream is lightly to moderately impacted by family residences on the lower reaches of the stream. The community development at the top of the watershed has a substantial but less direct impact on the entire stream.

Potential Project List:

1. Assess and remove fish passage barriers.
2. Conduct fish and habitat surveys to determine stream potential.
3. Assess and protect riparian, including canopy diversity.

## **DEVEREAUX CREEK - WRIA 14.0124**

Description: This creek historically drained the northwest end of Lake Devereaux. The placement of the railroad (circa 1940s) has altered the complexion of the watershed. The lake no longer feeds directly into the watershed. As a result, the stream has been known to exhibit portions of subsurface flow in years with low annual precipitation. The stream course has been fragmented by extensive development and landscape alterations (notably a highway bypass, railroad and powerlines). Beaver activity is present in the lowest reaches of the drainage.

Stock Status: Fall chum, cutthroat and coho are present; status is unknown.

NOTE: There are anecdotal accounts of steelhead and sockeye in this system.

Land Use: Residential development and logging activities

Factors for Decline: Logging activity, road crossings, vegetation removal for powerlines and residential development have all impacted a majority of this stream. A culvert barrier at the crossing of Highway 106 has limited the movement of fish beyond this point. The construction of the railroad has blocked the river continuum and severely altered the system.

Potential Project List:

1. Assess and remove fish passage barriers.
2. Conduct fish and habitat surveys to determine stream potential.
3. Assess, protect and restore riparian, including canopy diversity.
4. Restore natural outlet function of the lake back into historical watershed.

## **MASON COUNTY/WRIA 15 DRAINAGES**

### **SWEETWATER CREEK – WRIA 15.0505**

Description: The stream is approximately 0.9 miles in length. The upper reaches flow through an established second growth forest into an area adjacent to an elementary school. A streamside salmon incubation unit using fall chum eggs from WDFW's George Adams hatchery has been established here as an educational project. The area just beyond the school (and upstream of the highway culvert) is a marshy pond area. The stream then crosses under State Highway 3 in the southern portion of Belfair. Immediately below the culvert, the stream passes adjacent to several small businesses. From this point, the stream flows along the southern edge of a protected wetland preserve and into Hood Canal.

Stock Status: Coho, fall chum and cutthroat are present; status is unknown.

Land Use: This stream and the adjacent Union River estuary have become the focal point for the long range planning of the Belfair urban area. This stream flows almost entirely through land that is managed by the Hood Canal Watershed Project Center in cooperation with the North Mason School District and the Thelar Land Trust. A low developed residential area and several small businesses impact the lower reach.

Factors for Decline: The highway culvert acts to constrict water flows, has a resulting plunge pool and results in limiting the movement of trout and salmon. Several small businesses and land clearing impact the riparian area below the culvert.

Potential Project List:

1. Replace culvert at State Highway 3 (scheduled for summer, 2001).
2. Restore and protect riparian area along impacted area above and below culvert.

### **UNION RIVER - WRIA 15.0503**

Description: The watershed is 24 square miles with 10 miles mainstem and 30 miles of tributaries. The stream originates on the south and eastern sides of Gold Mountain. It flows through managed but undeveloped forest area to Union River Reservoir (City of Bremerton water supply) which is held by the Cascade dam. The stream flows down McKenna Falls (beginning of natural barrier) through low gradient broad mixed coniferous/deciduous floodplain to estuarine delta of Hood Canal. A unique characteristic of the Union River floodplain is the natural abundance of Belfast soil type (USDA Soil Survey for Mason County) consisting of silt and sandy loam. This is important when considering the type of riparian vegetation (predominantly red cedar, maple and willow) and gravel characteristics that naturally occur along the low gradient portion of the river.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (healthy in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (but not identified as a stock in 2002 SaSI)  
Healthy – coho, fall/late fall chum (2002 SaSI)  
Unknown - winter steelhead (2002 SaSI)  
NOTE: Chinook supplementation project has been discontinued; summer chum supplementation on-going, 2000 to present.

Land Use: Managed forest in the upper portions of the watershed (above the reservoir), water storage and diversion, some residential development, hobby farms, tree farms, gravel pits, retired commercial land fill, WDFW wildlife recreation area, warehouse and open storage area.

Factors for Decline: bridge constrictions (several); floodplain constriction by levees, residential development, hobby farms; bank hardening; riparian lacks conifer for LWD recruitment; summer low flows; elevated water temps; livestock; failing septic systems; estuarine impacts.

Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 15 Limiting Factors Analysis for riverine and nearshore June 2003
2. Kitsap Peninsula Salmonid Refugia Report 2003
3. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
4. Hood Canal Land Trust permanent protection of estuarine parcels; Klingel Wetlands enrolled in Wetlands Reserve Program
5. Thelar Wetlands ownership of estuarine parcels
6. WDFW acquisition of estuarine parcels

Restoration Activities Completed or Funded:

1. Removal of multiple fish passage barriers, including
  - a. Everson Creek (15.0507)
  - b. Bear Creek at Old Belfair Highway (15.0510)
  - c. Bear Creek at Bear Creek Road (15.0510)
  - d. Courtney Creek (15.0505)
  - e. Huson Creek Fish Ladder (not assigned)
  - f. McElhaney Creek (15.0508)
2. Bio-engineered bank stabilization in lower Union River

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through community stewardship, fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of the City of Bremerton Watershed. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Modify dikes and tidegates
  - b. Reestablish tidal sloughs
  - c. Reconnect freshwater sloughs and wetlands
4. Restore natural riverine processes and functions
  - a. Continue to restore and protect natural channel/floodplain processes and functions of mainstem and lower tributaries (i.e. road crossings)
  - b. Restore stream channel habitat complexity through key large woody debris and log jam addition in mainstem and especially lower tributaries
  - c. Fix remaining fish passage barriers
  - d. Plant and maintain riparian areas on both public and private properties, recognizing diversity of location, soil, and flora

- e. Evaluate management of flood zone area; assess flood activity as it relates to the natural processes for maintaining ecosystem function
- 5. Assess, stabilize, abate, and monitor fine and coarse sediment sources
  - a. Reduce sediment from roads
  - b. Monitor bed scour and bed stability in mainstem and multiple tributaries
- 6. Assess, abate, and monitor water quality/quantity
  - a. Elevate Best Management Practices
  - b. Monitor impacts of City of Bremerton water withdrawals (5 million gal/day)
  - c. Continue to monitor water temperature and quantity/discharge
  - d. Enact adequate stormwater requirements and mitigate for past practices, retrofitting where ever necessary
- 7. Continue fish and habitat monitoring
  - a. Channel habitat conditions
  - b. Estuarine recovery
  - c. Bed scour/aggradation

### **BIG MISSION RIVER - WRIA 15.0495**

Description: The watershed is about 13.7 square miles with about 10 miles of mainstem and 10 miles of tributaries. The headwaters originate in forested wetland above and to the northwest of Mission Lake in the western foothills of Gold Mountain. The stream then meets the western outflow of Mission Lake, flows through managed commercial forest and residential development to the mouth at Belfair State Park on Hood Canal. A characteristic of the Big Mission River floodplain is the natural abundance of Everett gravelly loamy sand soil type (USDA Soil Survey for Mason County) which consists mostly of gravel (characteristic of glacial till) and lesser amounts of fines. This is important when considering the riparian vegetation (predominantly Douglas fir) and gravel composition that naturally occurs along the river.

Stock Status: Healthy - fall chum, coho (2002 SaSI)

Land Use: Public and private commercial forest; residential development; state park at the mouth.

Factors for Decline: encroachment by residential development; road crossing constrictions and associated fill impacts; timber harvest; stream modifications and channelization; riparian buffer loss; lack of LWD and LWD recruitment; bank armoring; lack of channel complexity leading to increased redd scour; poorly sorted spawning gravels which inhibits redd formation; estuarine dikes; diked swimming area at Belfair State Park.

Protection/Restoration Activities Completed: Hood Canal Salmon Enhancement Group has replaced three culverts in the watershed, funded by USFWS, NFWF, WDFW and DNR.

Protection/Restoration Activities Currently Underway: Monitoring of fine sediment sources from Tahuya State Forest trail system with silt traps and other erosion control methods used by DNR.

Potential Project List:

- 1. Restore estuary function
  - a. Assess/remove constrictions, dikes and bulkheads for riverine and estuarine impacts, i.e. those associated with Belfair State Park
  - b. Remove rip rap, dikes and/or associated fill

2. Restore natural riverine function
  - a. Assess, stabilize, monitor sediment sources
  - b. Prohibit bank hardening
  - c. Promote bioengineering techniques
  - d. Remove rip rap
  - e. Restore complexity, such as addition of LWD
3. Repeat monitoring/surveys
  - a. Water quality monitoring
  - b. Ambient monitoring parameters
  - c. Monitor bed scour/aggradation

#### **LITTLE MISSION CREEK - WRIA 15.0493**

Description: Stream is 2.1 miles long with 2.1 miles tributaries.

Stock Status: Healthy: fall chum, coho (2002 SaSI)

Land Use: rural residential development, state park recreation area and state timberland.

Factors for Decline: forest practices; isolated floodplain

Protection/Restoration Activities Completed:

Potential Project List:

1. Assess and improve estuary function
2. Replace twin culverts and associated trash rack on North Shore Road (partial barrier due velocity
3. Inventory and assess current habitat

#### **JOHNSON CREEK - WRIA 15.0492**

Description:

Stock Status: Coho and fall chum present; status unknown

Land Use: Rural residential development; state timberland

Factors for Decline:

Protection/Restoration Activities Completed: Hood Canal Salmon Enhancement Group replaced one culvert in this watershed, funded by Mason Co, NFWF, and USFWS

Potential Project List:

1. Assess and remedy fish passage barriers
2. Monitor water quality

#### **HALL CREEK – WRIA 15.0491**

Description:

Stock Status: Coho and cutthroat are present. Status is unknown.

Land Use: Rural residential development, state timberland



Factors for Decline: Potential fish passage barriers; water quality from residential impacts.

Protection/Restoration Activities Completed: Hood Canal Salmon Enhancement Group replaced one culvert in this watershed, funded by Mason Co, NFWF, and USFWS

Potential Project List:

1. Assess and remedy fish passage barriers
2. Monitor water quality
3. Remove garbage

#### **STIMSON CREEK - WRIA 15.0488**

Description: The watershed is about 2.3 square miles. The stream is about 5.3 miles long.

Stock Status: Healthy: fall chum, coho (2002 SaSI)

Land Use:

Factors for Decline: The proximity of the Elfendahl Pass Road prevents natural meandering of the stream.

Protection/Restoration Activities Completed: Hood Canal Salmon Enhancement Group has replaced three fish passage barriers: Lower Stimson, Middle Stimson, and Upper Stimson, funded by HCSEG and SRFB. A smolt trap has been installed for evaluation.

Potential Project List:

1. Assess/remove barrier (culvert) on right bank tributary

#### **UNNAMED CREEK - WRIA 15.0486**

Description: stream is less than 0.5 miles in length

Stock Status: Unknown

Land Use:

Factors for Decline:

Potential Project List:

#### **UNNAMED CREEK - WRIA 15.0485**

Description: stream is less than 0.5 miles in length

Stock Status: Unknown

Land Use:

Factors for Decline:

Potential Project List:

#### **CADY CREEK – WRIA 15.0484**

Description:

Stock Status:

Land Use:

Factors for Decline:

Protection/Restoration Activities Completed:

1. Culvert replaced on Northshore Road

Potential Project List:

### **LITTLE SHOOFLY CREEK – WRIA 15.0482**

Description: lower reach has a fishway; debris trap at highway culvert

Stock Status: (Coho);

Healthy: fall chum (2002 SaSI)

Land Use:

Factors for Decline:

Protection/Restoration Activities Completed:

Potential Project List:

### **SHOOFLY CREEK - WRIA 15.0478**

Description: stream is 1.5 miles long;

Stock Status: Coho present

Healthy: fall chum

Land Use: Rural development; commercial and state timberland

Factors for Decline:

Protection/Restoration Activities Completed

Potential Project List:

### **TAHUYA RIVER - WRIA 15.0446**

Description: The Tahuya River watershed is 45.1 square miles with 21 miles mainstem and about 64.9 miles of tributaries. It originates in Green Mountains plateau, flows through Lake Tahuya, through gently rolling hills with low to moderate gradient, through a broad alluvial valley to the estuary. Tributaries with numerous wetlands help to moderate flow, although many smaller tributaries go dry in summer and even winter. A characteristic of the Tahuya River floodplain is the natural abundance of Everett Gravelly Loamy Sand soil type (USDA Soil Survey for Mason County) which consists of mostly gravel (characteristic of glacial till) and lesser amounts of fines. This is important when considering the type of riparian vegetation that naturally occurs along the river.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum extirpated but with rearing (extinct in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (but not identified as a stock in 2002 SaSI)

Depressed – winter steelhead (2002 SaSI)

Healthy – coho, fall chum (2002 SaSI)

NOTE: Chinook supplementation project has been discontinued; summer chum reintroduction program using Union River stock began in 2003; summer chum distribution could go to RM 8

Land Use: State and private timber harvest; Tahuya ORV trail system; agriculture; rural residential development

Factors for Decline: Shoreline development and associated bulkheads, fill, erosion, docks and loss of shoreline vegetation; residential development around natural lakes, reservoirs and wetlands; forestry and associated roads contributing to increased peak winter flows, decreased summer flows, and increased sedimentation; agriculture; loss of LWD; loss of species diversity within the riparian buffer; elevated water temps due to loss of riparian buffer; channel instability.

Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 15 Limiting Factors Analysis for riverine and nearshore June 2003
2. Kitsap Peninsula Salmonid Refugia Report 2003
3. Salmon habitat/channel condition inventory of watershed

Restoration Activities Completed or Funded:

1. Removal of multiple fish passage barriers, including
  - a. Schoolhouse Creek (15.0447)
  - b. Haven Lake Fishway (15.0461)
  - c. Wooten Lake Creek (15.0461a)
  - d. Charlie Creek at DBC Road (15.0470)
  - e. Charlie Creek at Toonerville Road (15.0470)
  - f. Buffin Creek (15.0466)
  - g. Little Tahuya (15.0457)
  - h. Haven Lake Creek/BLR (15.0461)
  - i. Unnamed Trib at Twin Lakes Road (15.0464)
  - j. Twin Lake Creek at Twin Lakes Road (15.0463)
  - k. Twin Lake Creek/BLR (15.0463)
  - l. Erdman Lake Creek (15.0459)
  - m. Outlet Creek at Twin Lakes Road (15.0466)
  - n. Grata Creek (15.0475)
  - o. Toonerville Creek (not assigned)
  - p. Long Marsh (15-0491)/(15.0457)
2. Large woody debris installations in wood-limited reaches (SRFB contract #01-1428)

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through community stewardship, fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain downstream of the Tahuya State Forest. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Restore natural riverine processes and functions
  - a. Protect and restore sinuosity and natural channel/floodplain configuration in artificially-confined reaches of mainstem
  - b. Restore stream channel habitat complexity through key large woody debris and log jam addition in mainstem and tributaries

- c. Plant and maintain riparian areas on both public and private properties with an emphasis on lower floodplain, recognizing diversity of location, soil, and flora
  - d. Evaluate management of flood zone area; assess need for flood activity as it relates to the natural processes for maintaining ecosystem function
- 4. Assess, stabilize, abate, and monitor fine and course sediment sources
  - a. Reduce sediment from roads
  - b. Monitor bed scour and bed stability in mainstem and multiple tributaries
- 5. Assess, abate, and monitor water quality/quantity
  - a. Elevate Best Management Practices
  - b. Continue to monitor water temperature and quantity/discharge
    - a. Enact adequate stormwater requirements and mitigate for past practices, retrofitting wherever necessary

#### **CALDERVIN CREEK - WRIA 15.0445**

Description: The mouth of this stream flows into Hood Canal just north of the Tahuya River. The stream is 1.5 miles long.

Stock Status: (coho) (chum) (1981 Stream Catalogue)

Land Use:

Factors for Decline:

Protection/Restoration Activities Completed:

Potential Project List:

#### **BROWN CREEK – WRIA 15.0444**

Description: stream is 1.5 miles long

Stock Status:

Land Use:

Factors for Decline:

Protection/Restoration Activities Completed:

Protection/Restoration Activities Currently Underway:

Potential Project List:

1. Replace undersized culvert at North Shore Road
2. Inventory and assess habitat

#### **RENSLAND CREEK - WRIA 15.0439**

Description: stream is 5.3 miles with 3.1 miles tributaries; lower reach is intermittent

Stock Status: Depressed: coho;

Healthy: fall chum

Land Use: forestry

Factors for Decline: low summer flows

Protection/Restoration Activities Completed

Protection/Restoration Activities Currently Underway

Potential Project List:

## **DON LAKE CREEK - WRIA 15.0438**

Description:

Stock Status: (coho, chum) (1981 Stream Catalogue)

Land Use:

Factors for Decline:

Protection/Restoration Activities Completed

Protection/Restoration Activities Currently Underway

Potential Project List:

1. Inventory and assess habitat

## **DEWATTO RIVER - WRIA 15.0420**

Description: The watershed is about 23 square miles with 8 miles of mainstem and 30 miles of tributaries. It originates in wetlands on the Tahuya peninsula plateau, flows through moderate gradient to a mostly undisturbed estuary. Numerous wetlands provide for a moderate annual flow.

Stock Status: See salmon distribution maps in Appendix A

Federally listed (threatened) – HC/ESJF summer chum extirpated but with rearing (extinct in 2002 SaSI); Puget Sound Chinook salmon rearing and spawning (but not identified as a stock in 2002 SaSI)

Depressed – winter steelhead (2002 SaSI)

Healthy – coho; late fall chum (2002 SaSI)

Factors for Decline: elevated stream temps; fine sediment due to logging and road building; decreased LWD.

Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 15 Limiting Factors Analysis for riverine and nearshore June 2003
2. Kitsap Peninsula Salmonid Refugia Report 2003
3. Riparian Easement Acquisition (SRFB contract #00-1084)
4. Salmon habitat/channel condition inventory of watershed
5. The Dewatto is Hood Canal Salmon Enhancement Group's pilot watershed for the development of their community-based watershed stewardship program.

Restoration Activities Completed or Funded:

1. Removal of multiple fish passage barriers, including
  - a. Oak Lake Creek (WRIA 15.0429),
  - b. Huson Creek (15.0423)
  - c. Ludvick Creek (15.0435)
  - d. Unnamed Trib (15.0434)
  - e. White Creek (15.0421)
  - f. Shoe Creek (15.0424)
  - g. Unnamed Trib (15.0427)
  - h. Larson Lake Creek (15.0425)
  - i. Cady Lake Creek (15.0421)
  - j. Manke Creek (15.0423a)

2. Large woody debris installations in wood-limited reaches (SRFB contract #01-1428)

Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain where appropriate. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Continue restoration of natural riverine processes and functions
  - a. Restore sinuosity and natural channel configuration in artificially-confined reaches by eliminating bank armoring, possibly with bioengineering techniques
  - b. Restore stream channel and off-channel habitat complexity through large woody debris and log jam addition
  - c. Plant and maintain riparian areas on both public and private properties
4. Assess, stabilize, and monitor fine and coarse sediment sources
  - a. Review and improve road maintenance plans to reduce sediment inputs
  - b. Revegetate road side-cast
  - c. Monitor gravel scour/aggradation
5. Continue monitoring habitat
  - a. Continue channel condition surveys
  - b. Monitor water temperature
  - c. Continue nitrification study

## KITSAP COUNTY/WRIA 15 DRAINAGES

### BIG ANDERSON CREEK - WRIA 15.0412

**Description:** This watershed is approximately 5 square miles, with 4 miles of mainstem and 13 miles of tributaries. The creek originates in headwater wetlands, flows through a confined ravine and opens into a broad floodplain in the lower 0.5 miles. This medium-sized estuarine delta includes a large intertidal mudflat.

**Stock Status:** See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum extirpated but with rearing in estuary (extinct in 2002 SaSI); Healthy – coho; late fall chum (2002 SaSI)

**Land Use:** Land use is primarily industrial forestry conducted by DNR and several large landowners. Three private residences and one small farm occur in the lower mile. A county road and abandoned railroad causeway constrict the mouth. Another road is adjacent to the river and in the 100-year floodplain from RM 0.5 to the mouth. 45% of the riparian zone is occupied (36% roads and 9% agriculture).

**Factors for Decline:** increased sediment deposition in lower mile from past logging practices and associated roads throughout watershed; increased magnitude and frequency of peak flows from road runoff; loss of LWD; county road at mouth/estuary constrains floodplain and may reduce sediment removal by tidal action.

**Protection Activities Completed or Funded:**

1. Washington Conservation Commission WRIA 15 Limiting Factors Analysis for riverine and nearshore June 2003
2. Kitsap Peninsula Salmonid Refugia Report 2003

**Restoration Activities Completed or Funded:**

**Potential Project List:**

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Priority areas include estuary and mainstem floodplain where appropriate. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Remove railroad grade
  - b. Evaluate and abate the effects of the county road crossing
  - c. Control exotic vegetation
4. Continue restoration of natural riverine processes and functions
  - a. Restore sinuosity and natural channel configuration in artificially-confined reaches
    - i. Re-locate roads outside of floodplain and channel migration zone
  - b. Restore stream channel and off-channel habitat complexity through large woody debris and log jam addition

- c. Plant and maintain riparian areas on both public and private properties, while seeking to increase riparian buffer width
- 5. Assess, stabilize, and monitor fine and coarse sediment sources
  - a. Implement road decommissioning and/or repair roads
  - b. Review and improve road maintenance plans to reduce sediment inputs
    - i. Re-direct road ditches
    - ii. Prevent logging on unstable slopes
  - c. Limit new road construction
- 6. Continue monitoring habitat
  - a. Install flow gauges
  - b. Conduct scour chain surveys
  - c. Conduct sediment surveys
  - d. Conduct summer chum spawner surveys

#### **HARDING CREEK - WRIA 15.0408**

Description: extensive wetlands; focal sub-watershed

Land Use: commercial forest; minimal rural housing

Stock Status: healthy: coho (2002 SaSI)

Factors for Decline: massive slope failures; invasive bamboo; logging roads

Protection/Restoration Activities Completed:

Protection/Restoration Activities Currently Underway:

Potential Project List:

- 1. Assess, stabilize, monitor sediment sources
  - a. Decommission abandoned logging roads
  - b. Maintain logging roads and their runoff
- 2. Assess, protect, restore riparian
- 3. Conduct fish passage inventory

#### **NELLITA CREEK - WRIA 15.0407A**

Description:

Land Use:

Stock Status:

Factors for Decline:

Protection/Restoration Activities Completed:

Protection/Restoration Activities Currently Underway:

Potential Project List:

#### **BOYCE CREEK - WRIA 15.0407**

Description: extensive wetlands; focal sub-watershed; forested

Land Use: commercial forest; minimal housing

Stock Status:

Factors for Decline: mass wasting

Protection/Restoration Activities Completed:

Protection/Restoration Activities Currently Underway:



Potential Project List:

1. Assess, stabilize, monitor sediment sources
  - a. Decommission abandoned logging roads
  - b. Maintain logging roads and their runoff
2. Assess, protect, restore riparian
3. Restore complexity, add LWD

**STAVIS CREEK - WRIA 15.0404**

Description: watershed area is about 7 square miles, with 5 miles mainstem and 11 miles tributary habitat; the creek originates in a series of beaver ponds, forested and emergent wetlands on a flat, glacial till plain (not Morgan Marsh, although groundwater interchange is likely), flows through steep and tightly confined ravines for about 3.5 miles and opens onto a broad floodplain; riparian zone intact; the high quality estuary and delta are good examples of undisturbed estuarine lagoon and spit features in Hood Canal.

Stock Status:                Federally listed: summer chum – historic occurrences (75 fish in 1972, 9 fish in 1983),  
                                      Healthy: fall chum, coho (2002 SaSI).

Land Use: rural residential along shorelines, lower 0.5 mile of stream and upper watershed; majority in commercial forestry with DNR and limited private holdings and Kitsap Forest Natural Area Preserve; conservation easements currently underway on lower 0.6 miles through Hood Canal Salmon Sanctuary; low concentration of shoreline development and associated impacts (bankhardening, bulkhead construction, and loss of shoreline vegetation) is primarily on shoreline to east of Stavis Creek.

Factors for Decline: sedimentation with moderate scour and fill associated with peak winter flows due to past logging practices, mass wasting and removal of LWD; short term loss of LWD recruitment.

Protection/Restoration Activities Completed:

1. Kitsap County received SRFB funding for preservation of the estuary.

Potential Project List:

1. Restore natural riverine function
  - a. Assess, stabilize, monitor sediment sources
  - b. Abandon roads from RM 0.0 to 0.6
  - c. Evaluate and/or modify forest practices
2. Assess, protect, restore riparian
3. Preserve, protect estuary (Hood Canal Salmon Sanctuary)
4. Correct fish passage barrier at Seabeck/Holly Road
5. Monitor the following parameters
  - a. Install flow gauge
  - b. Conduct summer chum survey

**SEABECK CREEK - WRIA 15.0400**

Description: watershed is about 6 square miles, with 5 miles of mainstem and 16 miles of tributaries; the creek originates in headwater wetlands on a flat glacial till plain; the creek flows

north through a steep tightly confined ravine for about 2 miles and opens to a broad floodplain, small estuary with a narrow delta and Seabeck Bay.

Stock Status: Federally listed: summer chum unknown but possible historic occurrences (WDFW and PNPTT, 2000)  
Healthy: fall chum, coho (2002 SaSI)

Land Use: rural residential, commercial forest lands, forest conversions, small scale hobby farms, limited aquaculture, the nearby town of Seabeck and a marina.

Factors for Decline: coarse sediment aggradation leading to loss of channel complexity and stranding of upstream migrating adult fish; reduction of egg survival due to scour; high levels of fine sediment in spawning gravels from road runoff, improper logging; increased predation on juveniles due to loss of stream depth and cover; loss of channel complexity leading to increased flooding frequency; altered hydrologic patterns due to reduced channel capacity; degraded riparian conditions; floodplain connectivity due rural development, channel alteration, bridge crossing; loss of LWD; estuary modification with bulkheads, residential development.

Protection/Restoration Activities Completed: Seabeck Alki Team has conducted a variety of educational projects.

Potential Project List:

1. Maintain minimum flows, especially summer
  - a. Establish, monitor instream flow
  - b. Establish impervious surface target rates (5%?)
  - c. Assess channel capacity
  - d. Retrofit developments' stormwater systems
  - e. Maintain 60% watershed in forest
2. Protect, restore estuary (Hood Canal Salmon Sanctuary)
  - a. Remove railroad fill
3. Restore natural riverine function
  - a. Assess, stabilize, monitor sediment sources
    1. Improve road maintenance
  - b. Preserve, restore riparian
  - c. Restore complexity, add LWD
4. Conduct summer chum surveys
5. Investigate, remove barrier log check dam below Seabeck/Holly culvert

**LITTLE BEEF CREEK - WRIA 15.0399**

Description:

Land Use:

Stock Status: Healthy: coho (2002 SaSI)

Factors for Decline: mass wasting; poor riparian conditions; fish passage barriers

Protection/Restoration Activities Completed:

Potential Project List:

1. Assess, stabilize, monitor sediment sources
  - a. Decommission abandoned logging roads
  - b. Maintain logging roads and their runoff

2. Protect, restore estuary
3. Assess, protect, restore riparian

### **BIG BEEF CREEK - WRIA 15.0389**

Description: The Big Beef watershed is about 14 square miles, with 11 miles of mainstem and 24 miles of tributaries. The creek originates in a series of wetlands, flows through Lake Symington, down a moderately confined ravine, and opens up to a complex floodplain with side channel habitats. The estuary is 47.7 acres in a semi-enclosed lagoon, composed mostly of intertidal mudflats.

Stock Status: See salmon distribution maps in Appendix A  
Federally listed (threatened) – HC/ESJF summer chum spawning and rearing (extinct in 2002 SaSI)  
Healthy – coho; fall chum (2002 SaSI)  
NOTE: Summer chum stock was extirpated. Summer chum reintroduction program using Big Quilcene River stock conducted 1996 to present.

Land Use: The upper watershed harbors intense commercial forest activities, while hobby farms and residential development occur around Lake Symington. The UW research facility is located in the lower valley bottom and upper estuary.

Factors for Decline: Altered hydrologic patterns from residential development for both low flows and winter peaks are a significant limiting factor. Coarse sediment aggradation; high levels fine sediment in spawning gravels; loss of channel complexity; alteration of estuarine habitats; degraded riparian conditions; elevated temperatures from Lake Symington and general development impacts.

#### Protection Activities Completed or Funded:

1. Washington Conservation Commission WRIA 15 Limiting Factors Analysis for riverine and nearshore June 2003
2. West Kitsap Watershed Analysis by Department of Natural Resources 1995
3. Kitsap Peninsula Salmonid Refugia Report 2003
4. Ecosystem Diagnosis and Treatment on-going for summer chum (*but not fully funded*)
5. Hood Canal Salmon Sanctuary (SRFB contract #99-1671)
6. HCSS and it's partners have protected over 725 acres in Big Beef and Stavis watersheds
7. UW Research Facility owns lower portion of creek and estuary
8. UW developing K-12 curriculum and university research

#### Restoration Activities Completed or Funded:

1. Replaced fish barrier (culvert) in the upper watershed, funded by DNR/JFE
2. Summer chum spawning channel in the lower floodplain (SRFB contract #99-1372)
3. Big Beef Summer Chum Recovery project (SRFB contract #99-1672)
4. Summer chum salmon stock re-introduction project
5. Other WDFW, County, Conservation District, UW projects??
6. Intensively Monitored Watershed for validation monitoring (SRFB contract)

#### Potential Project List:

1. Provide protection of high quality habitat or restoration of degraded habitats through fee-simple purchase or conservation easements. Community stewardship and public outreach/education are inextricably linked to all salmon recovery actions.
2. Restore estuarine and nearshore habitats as recommended in Nearshore LFA (see lists of recommended actions in Appendix B)
3. Re-establish functional link between estuary and freshwater habitats
  - a. Address causeway impacts
  - b. Address fish-weir impacts
  - c. Remove University of Washington service road
4. Continue restoration of natural riverine processes and functions above WDFW property restoration site
  - a. Restore sinuosity and natural channel configuration in artificially-confined reaches
  - b. Restore stream channel, off-channel, and wetland habitat complexity through large woody debris and log jam addition
  - c. Plant and maintain riparian areas on both public and private properties
    - i. Retain at least 60% watershed forest cover
    - ii. Establish impervious surface thresholds
5. Assess, stabilize, and monitor fine and course sediment sources
  - a. Implement road decommissioning and/or repair roads
  - a. Review and improve road maintenance plans to reduce sediment inputs
    - i. Re-direct road ditches
    - ii. Prevent logging on unstable slopes
  - b. Limit new road construction, especially near ravines at Lake Symington
  - c. Assess scour and deposition
6. Assess water quality and quantity in WRIA 15 Planning Unit
  - a. Establish instream flows for summer lows and winter peaks
  - b. Address temperature issue from Lake Symington
7. Support the Intensively Monitored Watershed Program

#### **JOHNSON CREEK – WRIA 15.0387**

Description:

Land Use:

Stock Status:

Factors for Decline:

Protection/Restoration Activities Completed:

Potential Project List:

#### **LITTLE ANDERSON CREEK - WRIA 15.0377**

Description:

Land Use:

Stock Status:

Factors for Decline: mass wasting; poor riparian cover; fish passage barriers

Protection/Restoration Activities Completed:

1. Culvert at Little Anderson Hill Road replaced with bridge

Potential Project List:

1. Assess, stabilize, monitor sediment sources
  - a. Decommission abandoned roads
  - b. Maintain, manage road surface and their runoff
2. Protect, restore property downstream of culvert and upstream of park
3. Maintain county park at estuary
  - a. Maintain low impact status
  - b. Control, eliminate invasive species
4. Protect, restore riparian

#### **CATTAIL LAKE CREEK - WRIA 15.0370**

Description:

Land Use:

Stock Status:

Factors for Decline: gravel accumulation

Protection/Restoration Activities Completed:

Protection/Restoration Activities Currently Underway:

Potential Project List:

#### **JUMP-OFF-JOE CREEK - WRIA 15.0369**

Description:

Land Use:

Stock Status:

Factors for Decline: gravel accumulation

Protection/Restoration Activities Completed:

Potential Project List:

1. Assess, stabilize, monitor sediment sources
2. Conduct fish passage inventory

#### **COUGAR CREEK - WRIA 15.0367**

Description: Cougar Creek is known locally as Wildcat Creek; Kinman Creek (WRIA 15.036\*) is a tributary to Cougar Creek.

Land Use: rural residence; agriculture; livestock

Stock Status

Factors for Decline: passage barriers; water quality

Protection/Restoration Activities Completed:

1. Culvert on Kinman Creek at Hwy 3 has been replaced
2. Lower mainstem complexity

Potential Project List;

1. Replace tributary culvert at Hwy 3
2. Assess, stabilize, monitor sediment sources
3. BMPs for livestock runoff
4. Assess, protect, restore riparian

### **GAMBLE CREEK - WRIA 15.0356**

Description:

Land Use: rural residence; agriculture

Stock Status: coho, chum

Factors for Decline: straightened channels; ditching; diking; water quality; loss of riparian and LWD recruitment; lack of structure; water temperatures

Protection/Restoration Activities Completed: Kitsap County Conservation District conducted stream restoration (sinuosity, complexity, cattle exclusion fencing and riparian planting), funded by KCCD and North Olympic Salmon Coalition;

Protection/Restoration Activities Currently Underway:

Potential Project List

1. Protect, restore shoreline near Port Gamble
2. Restore complexity
  - a. Add LWD
  - b. Restore sinuosity
  - c. Apply BMPs for agriculture
  - d. Replant riparian
3. Assess, monitor flows
  - a. Monitor withdrawals
  - b. Monitor water temperatures

### **MARTHA JOHN - WRIA 15.0354**

Description:

Land Use: rural residential; agriculture

Stock Status:

Factors for Decline: loss of riparian and LWD, water quality; lack of structure; ditching

Protection/Restoration Activities Completed:

1. Port Gamble Sklallam Tribe conducted stream restoration (sinuosity, complexity, cattle exclusion fencing and riparian planting), funded by PGST and North Olympic Salmon Coalition.

Potential Project List

1. Apply Best Management Practices for livestock/agriculture
2. Protect headwater wetlands
3. Protect forested habitat

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